

# Applied Anatomy of **CORONARY CIRCULATION**

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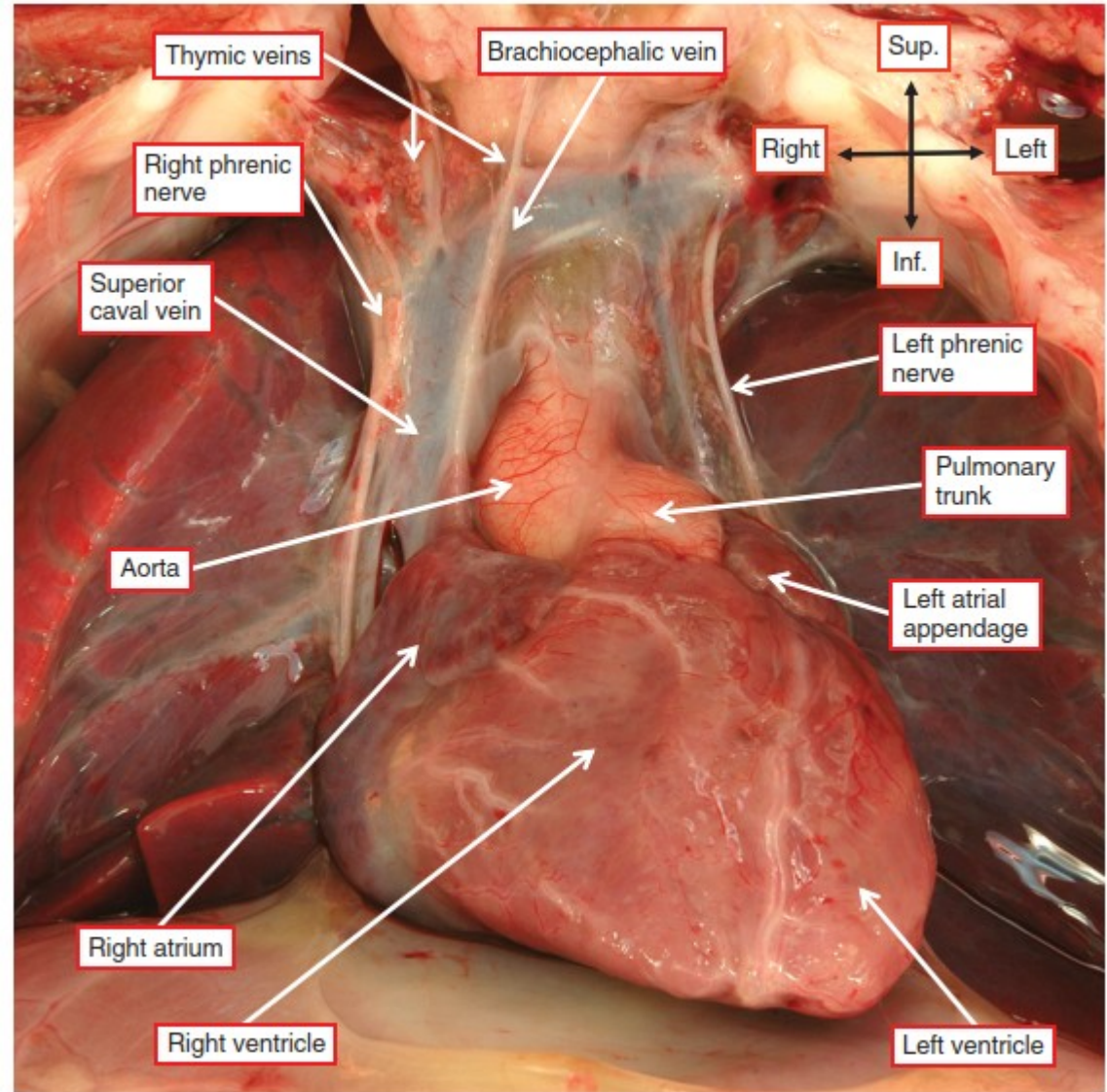
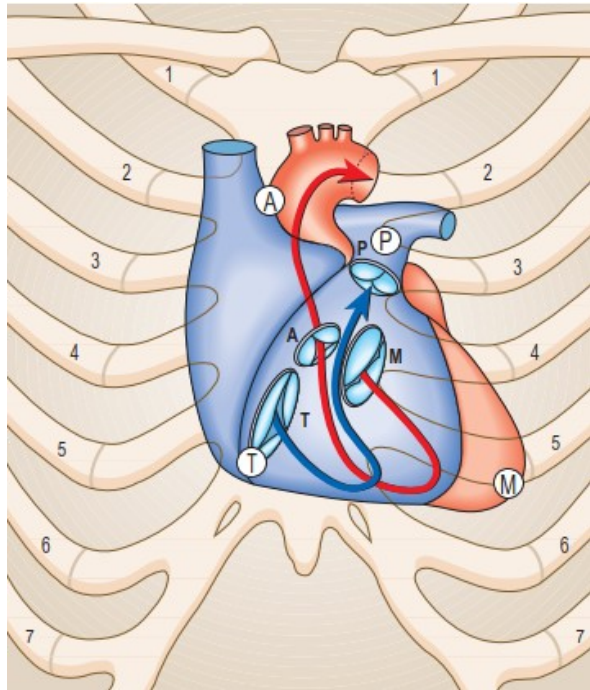
# Outline

- Anatomy of Coronary Circulation – Arterial and Venous
- Applied Aspects
  - Myocardial Infarction
  - Coronary Angiography – CAG → Done by Cardiologist
  - Coronary Angioplasty – PTCA → Done by Cardiologist
  - Coronary Artery Bypass Surgery – CABG → Done by Cardiac Surgeon

# Anatomy of Coronary Circulation

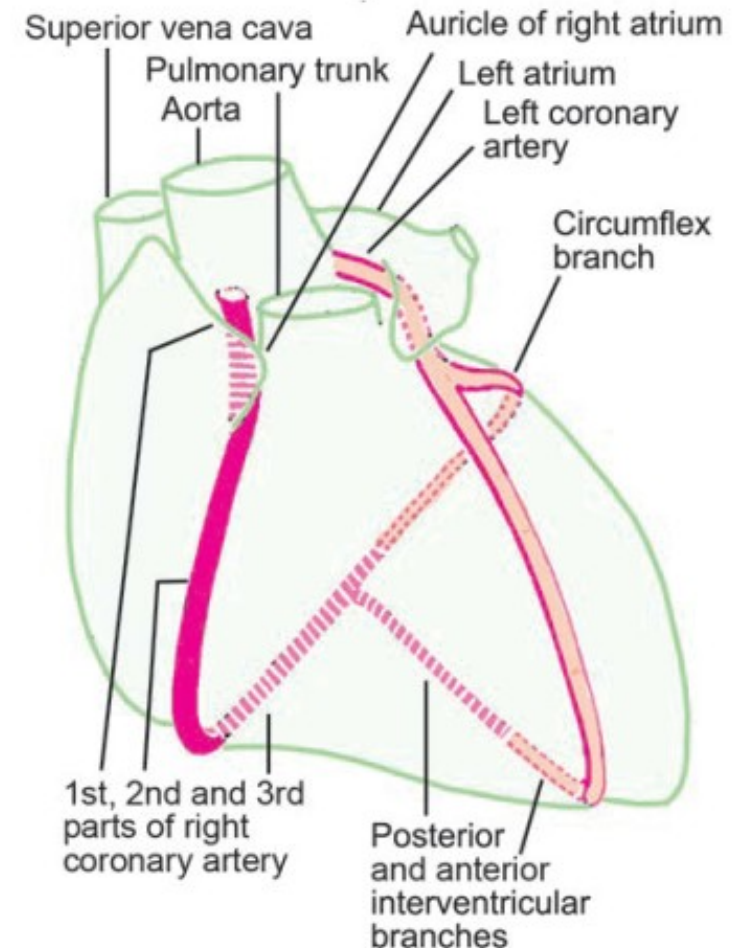
Arterial

- Left Coronary System
- Right Coronary System



# External Sulci

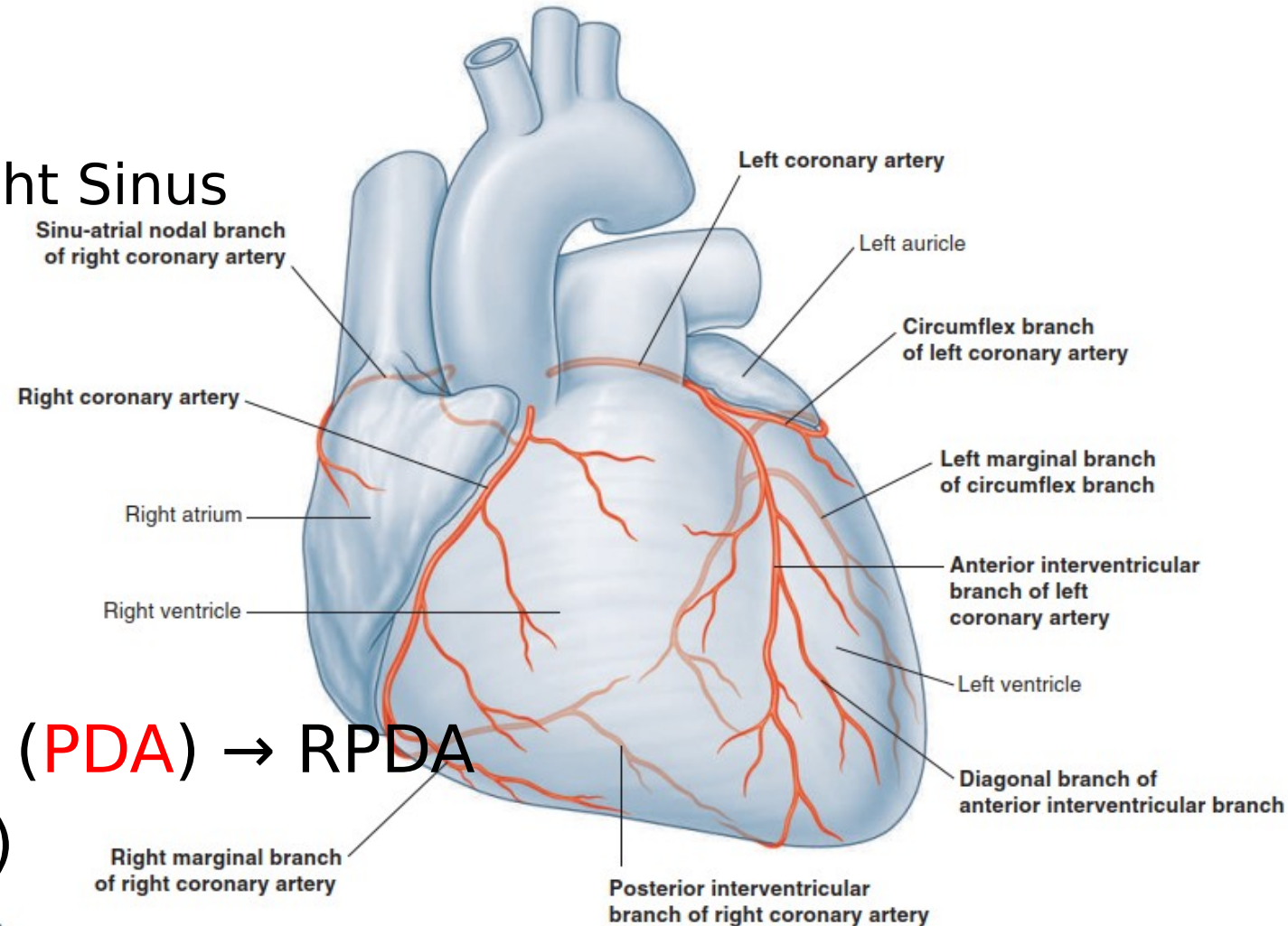
- Atrioventricular Groove (Coronary Sulcus)
- Interventricular Groove
- **Crux** – where both grooves meet.





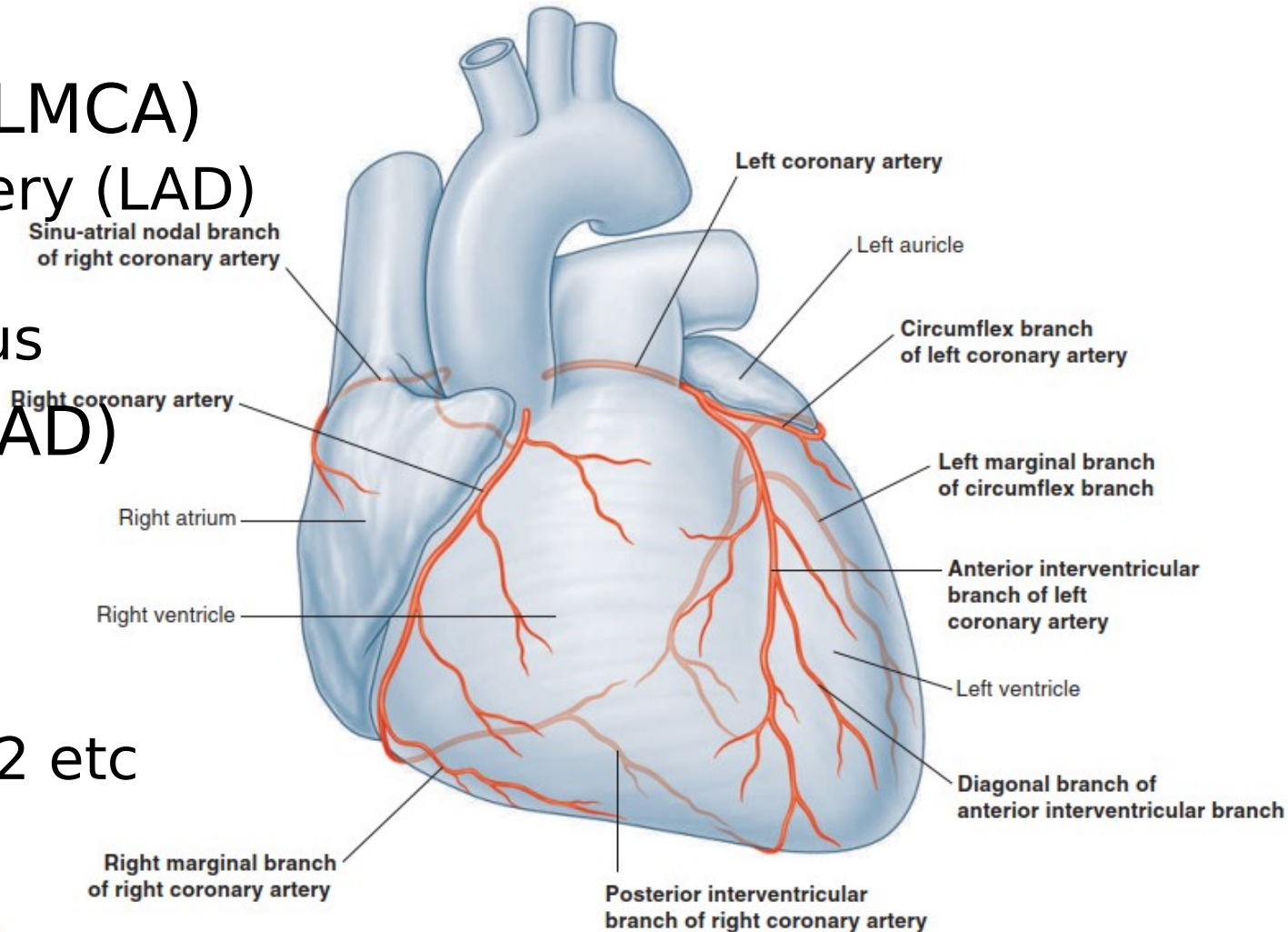
# Branches of Right Coronary Artery (RCA)

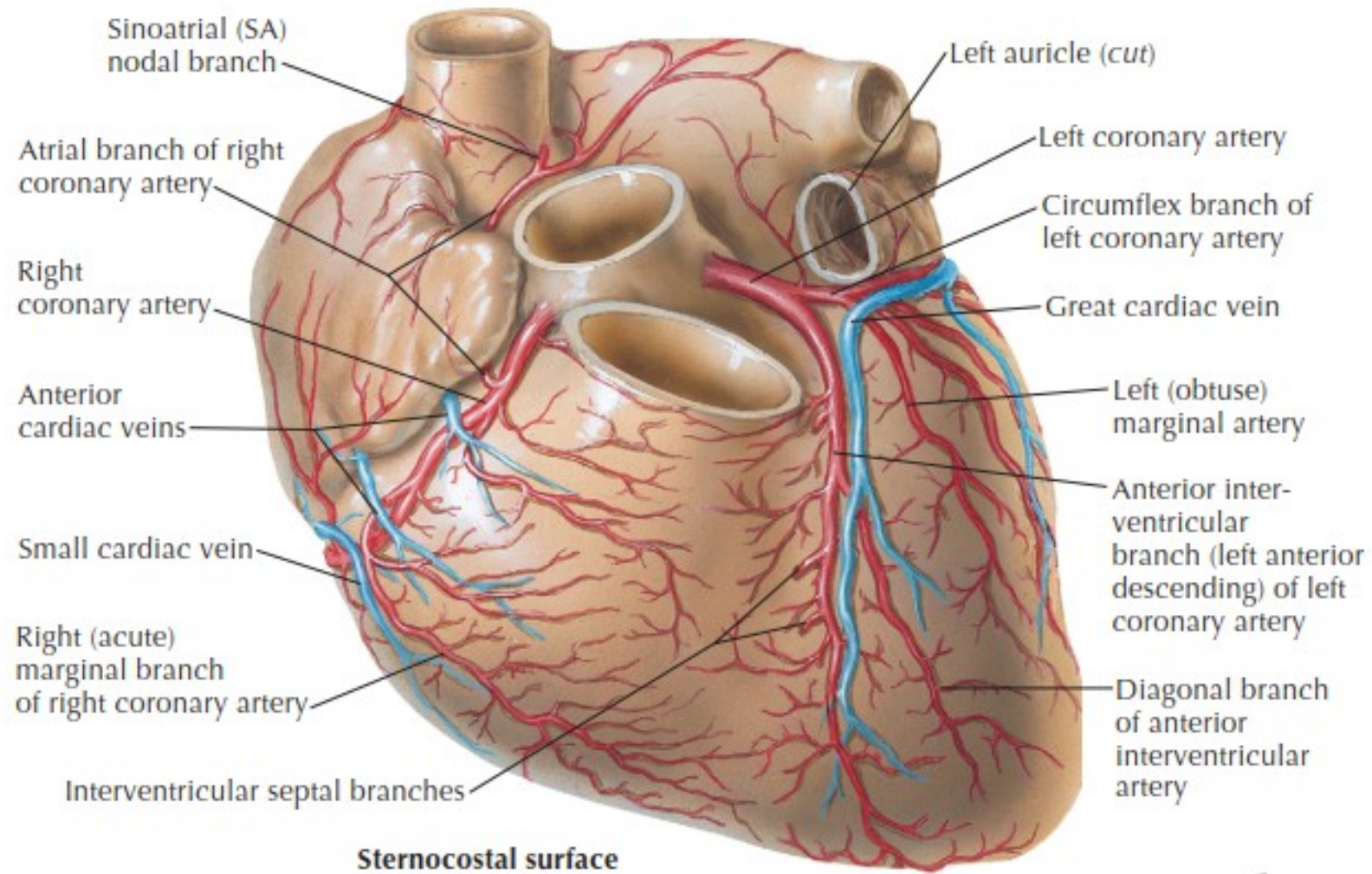
- Conus Artery
  - May arise separately from Right Sinus
  - 'Third Coronary Artery'
  - Supplies Pulmonary Conus
  - Injection into conus → VF
- **SA** Nodal Artery (Sino Atrial)
  - Supplies SA Node
- Acute Marginal Artery
- Posterior Descending Artery (**PDA**) → RPDA
- Postero-Lateral Branch (**PLB**)



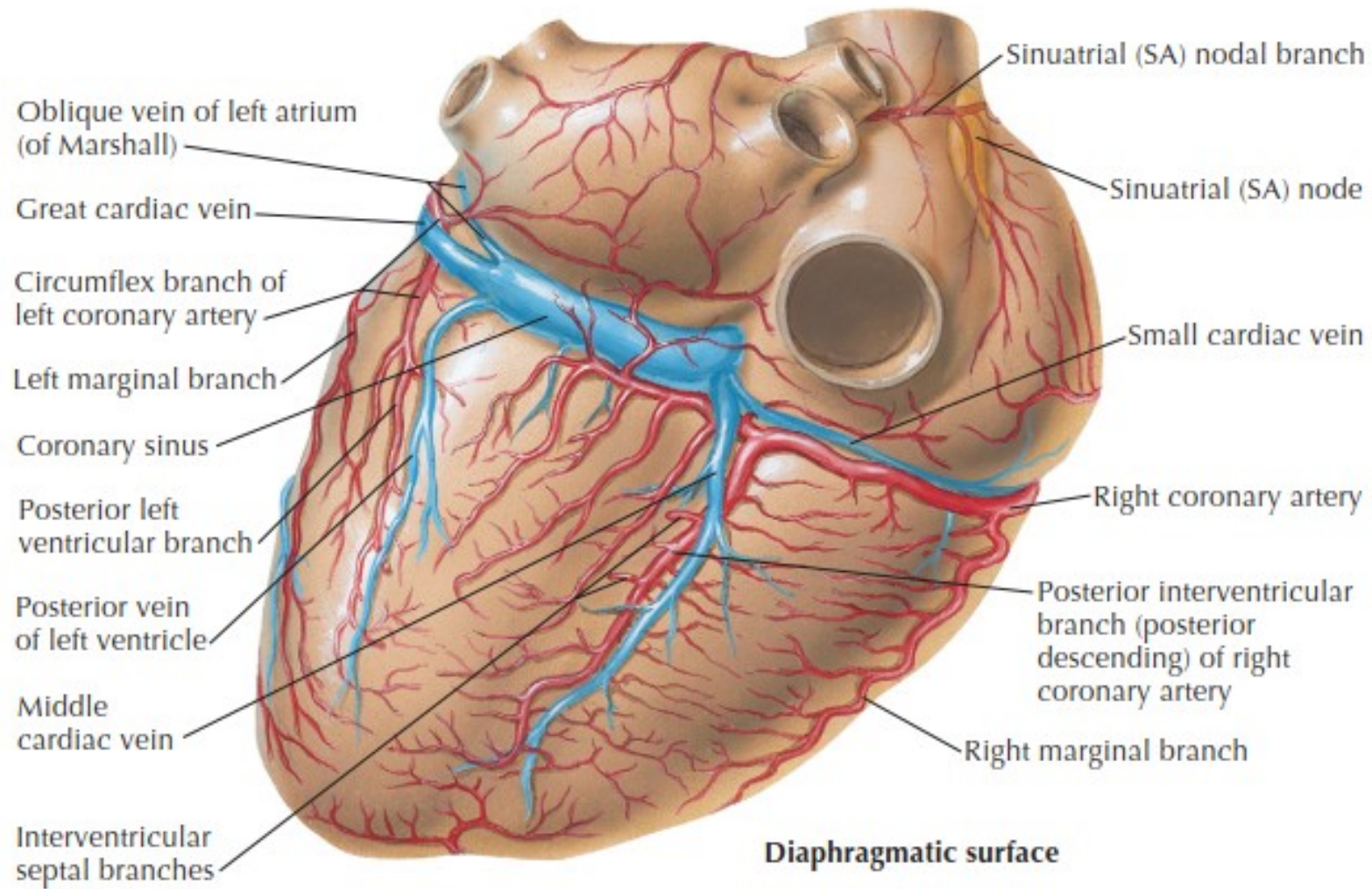
# Branches of Left Coronary Artery (LCA)

- Left Main Coronary Artery (LMCA)
  - Left Anterior Descending Artery (LAD)
  - Left Circumflex Artery (LCx)
  - At times - Trifurcation - Ramus
- Left Anterior Descending (LAD)
  - Diagonals - D1, D2, D3 etc
  - Septal - S1, S2 etc
- Left Circumflex Artery
  - Obtuse Marginals - OM1, OM2 etc
  - LPDA

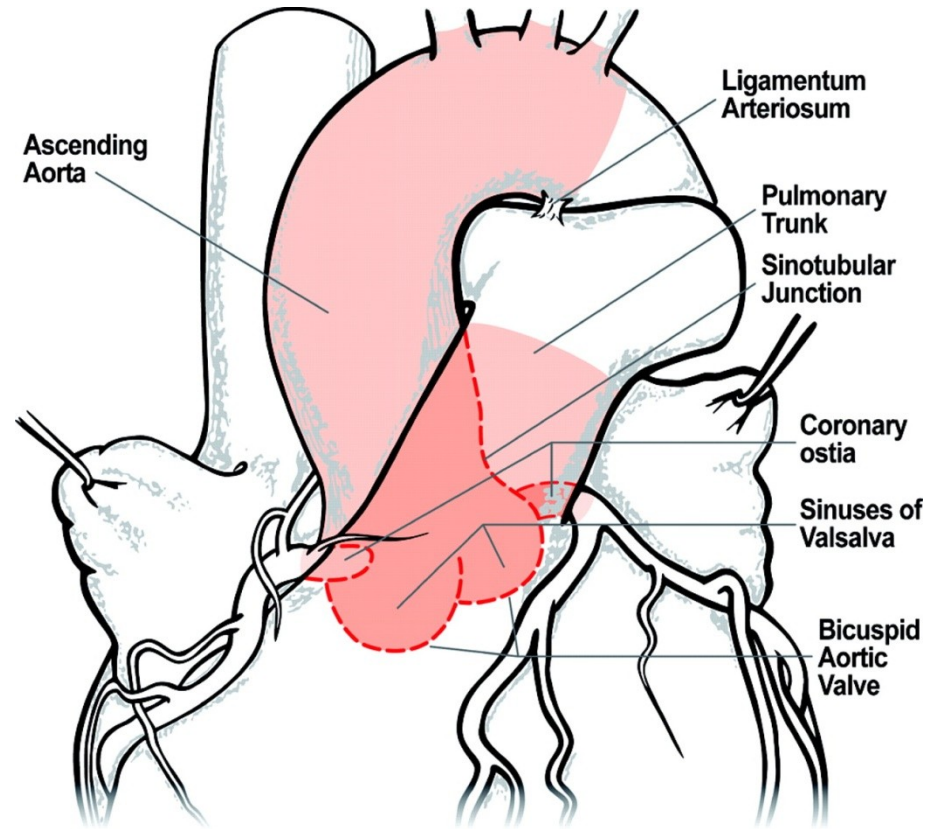


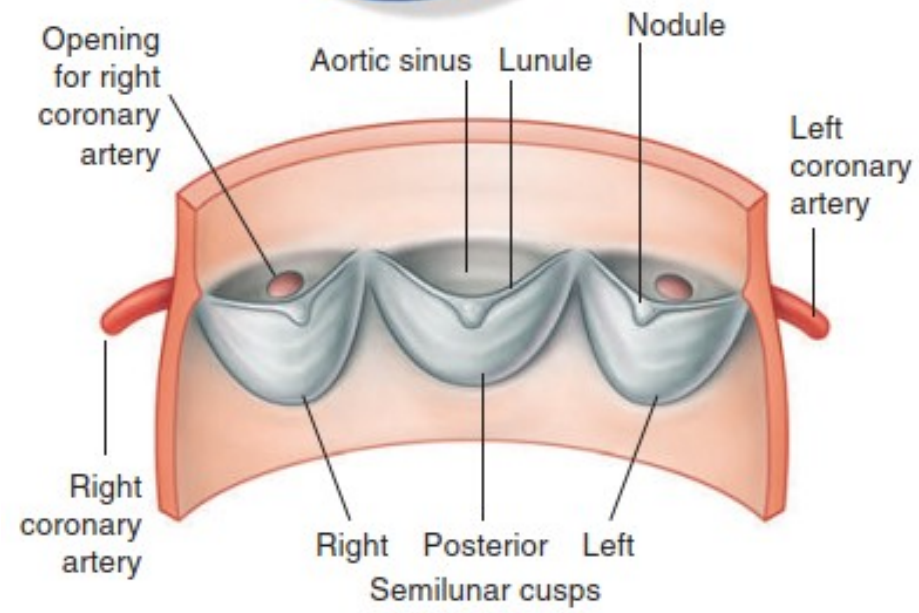
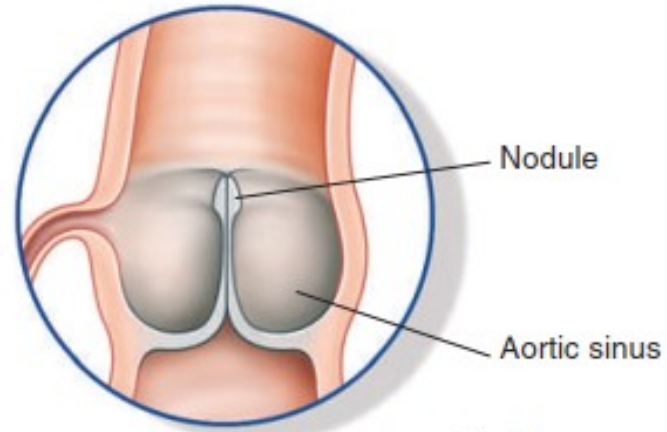


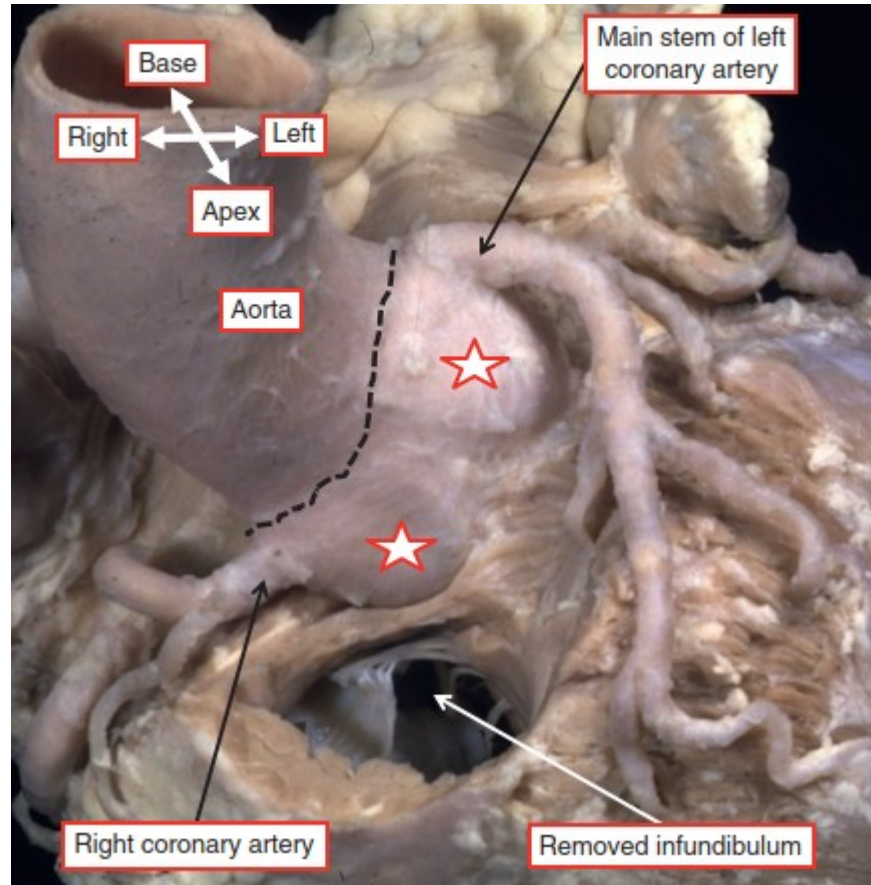




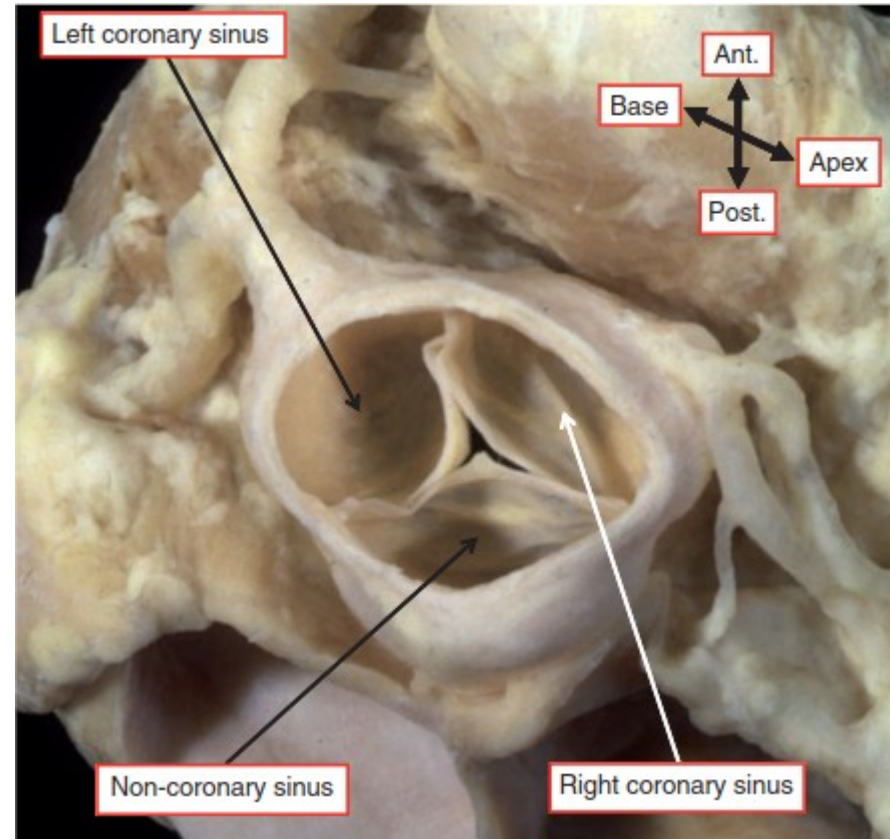
# Origin of Coronary Arteries

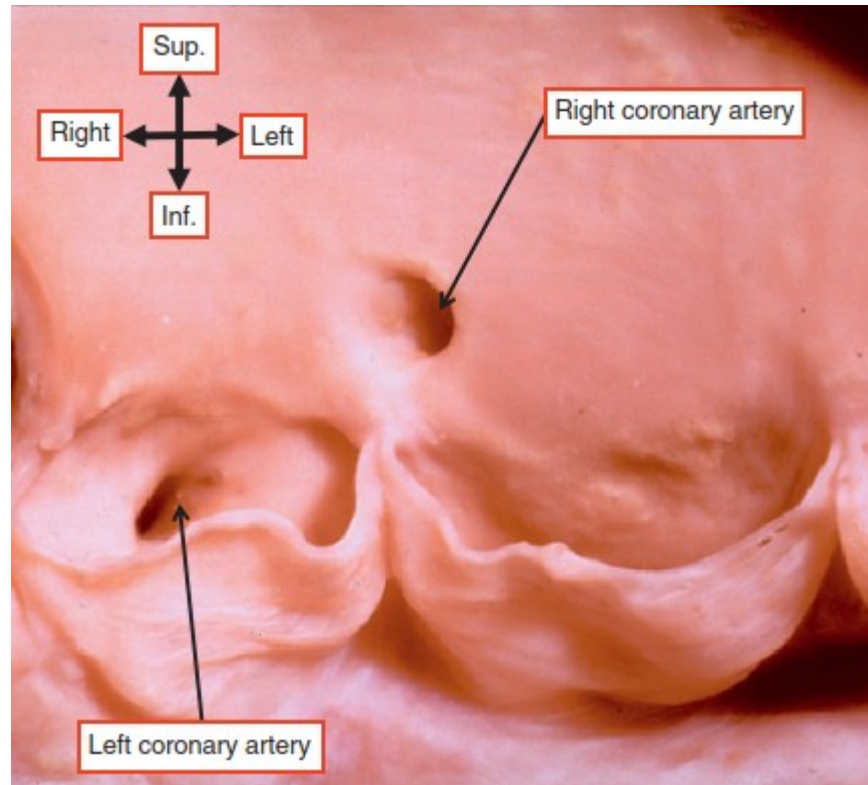






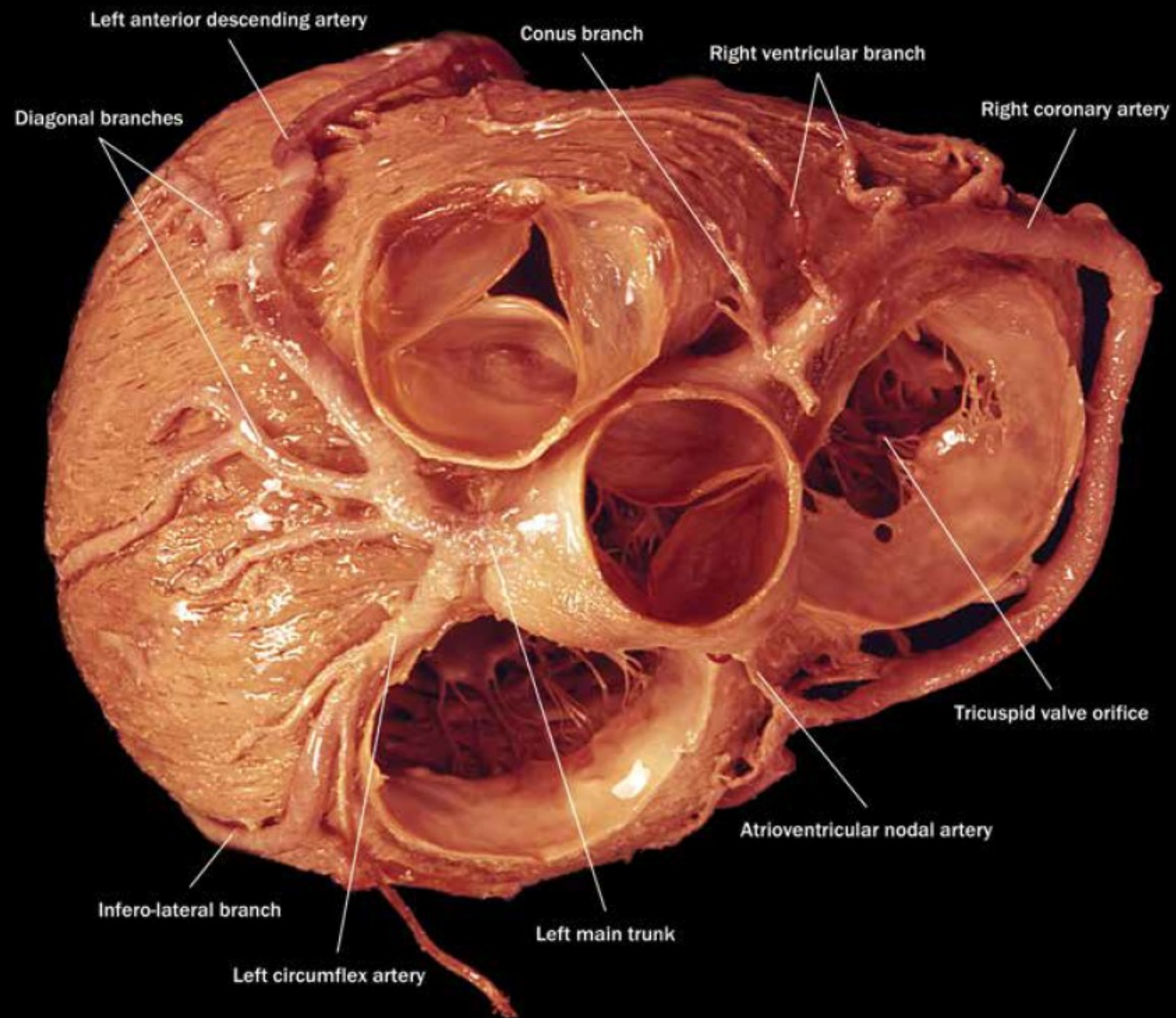




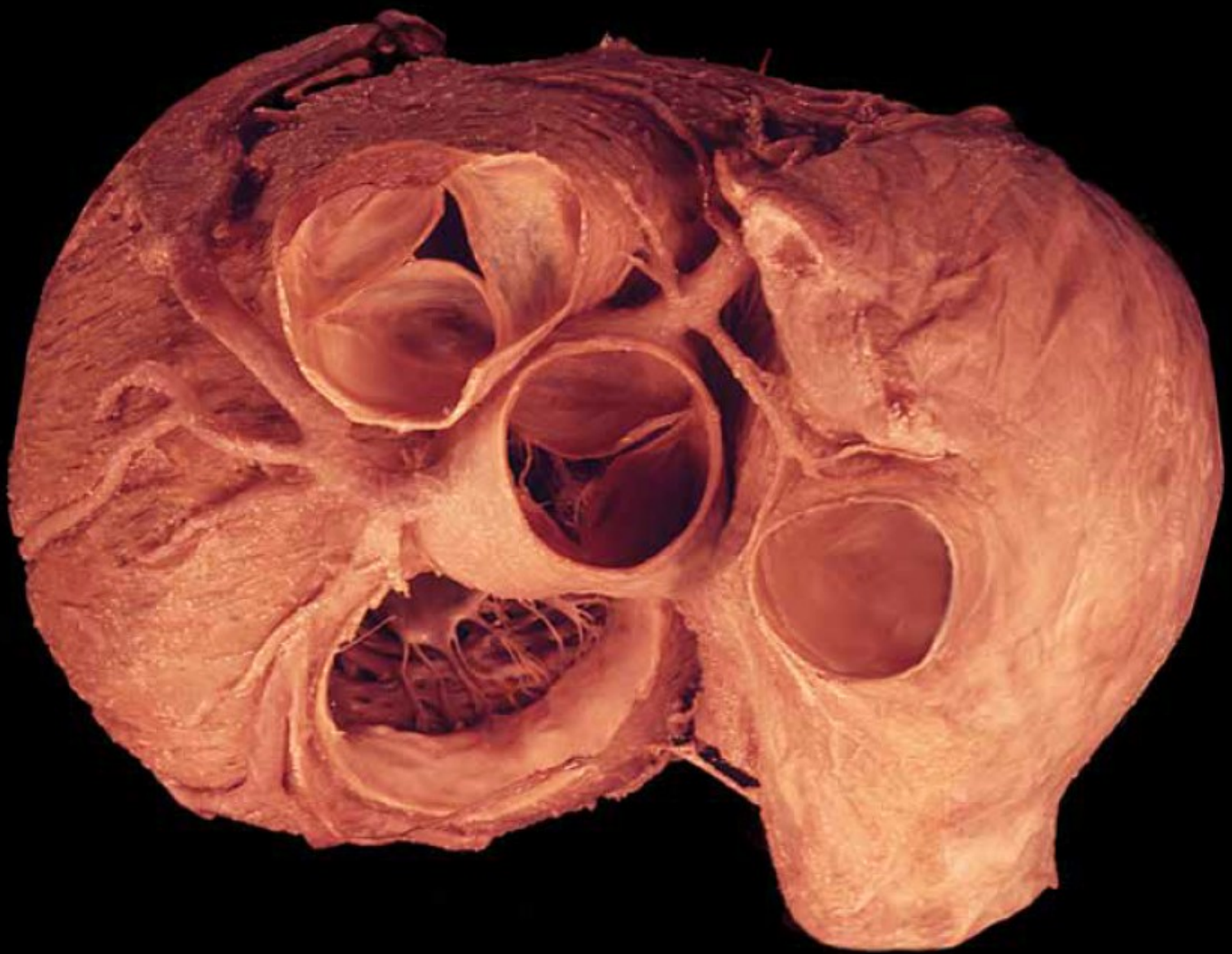


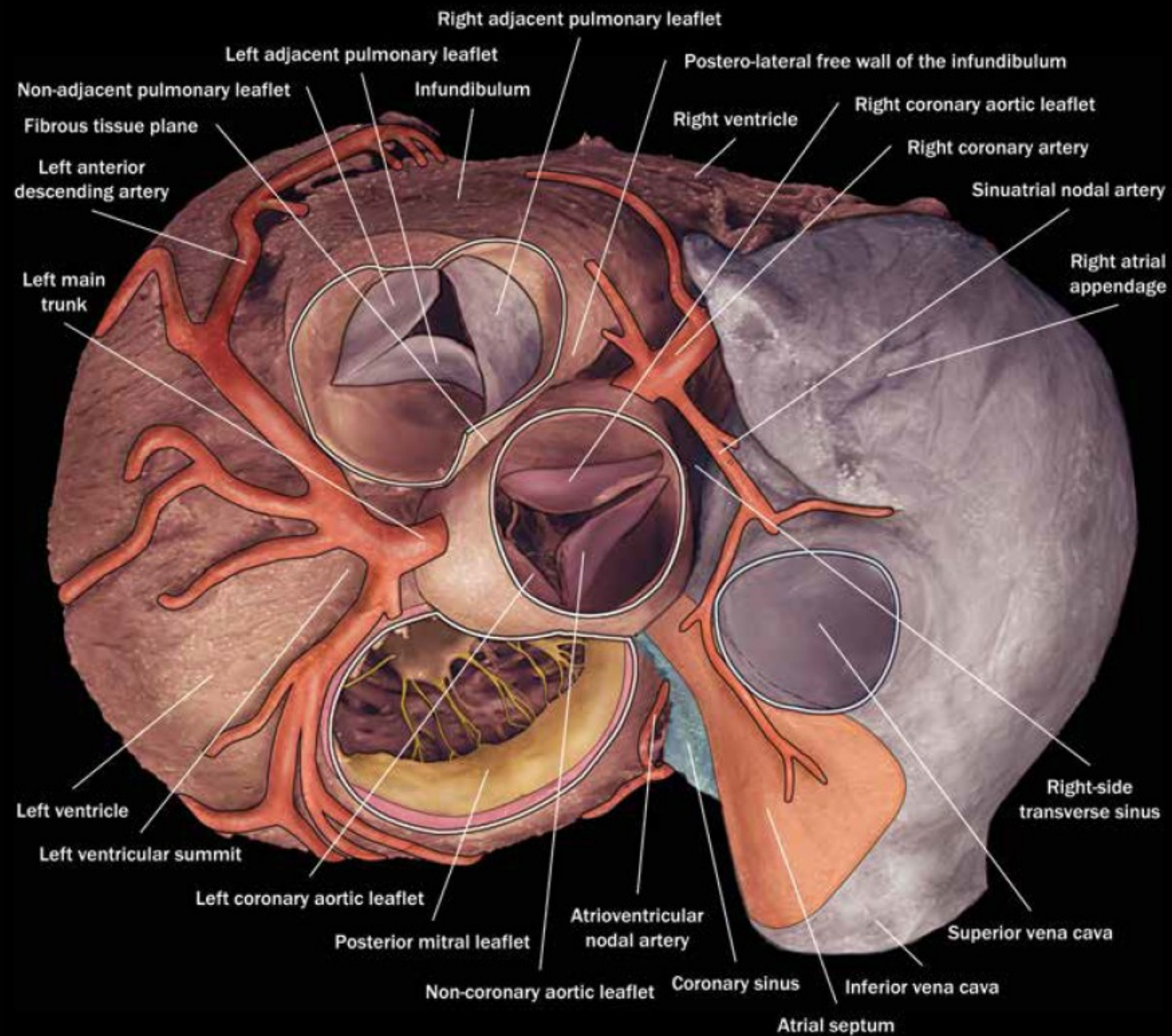














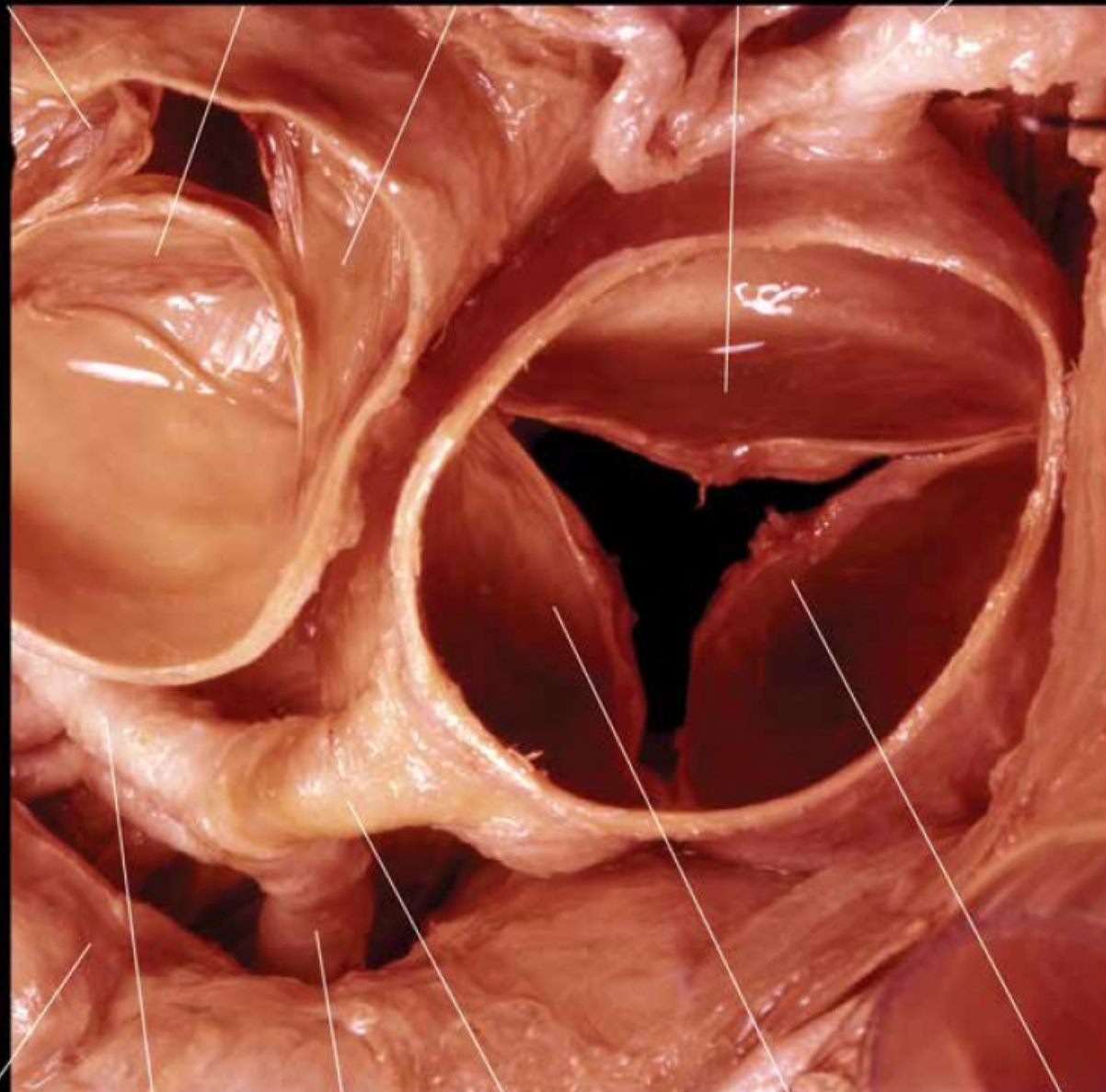
Non-adjacent  
pulmonary leaflet

Left adjacent  
pulmonary leaflet

Right adjacent  
pulmonary leaflet

Right coronary  
aortic leaflet

Right coronary artery



Left atrial  
appendage

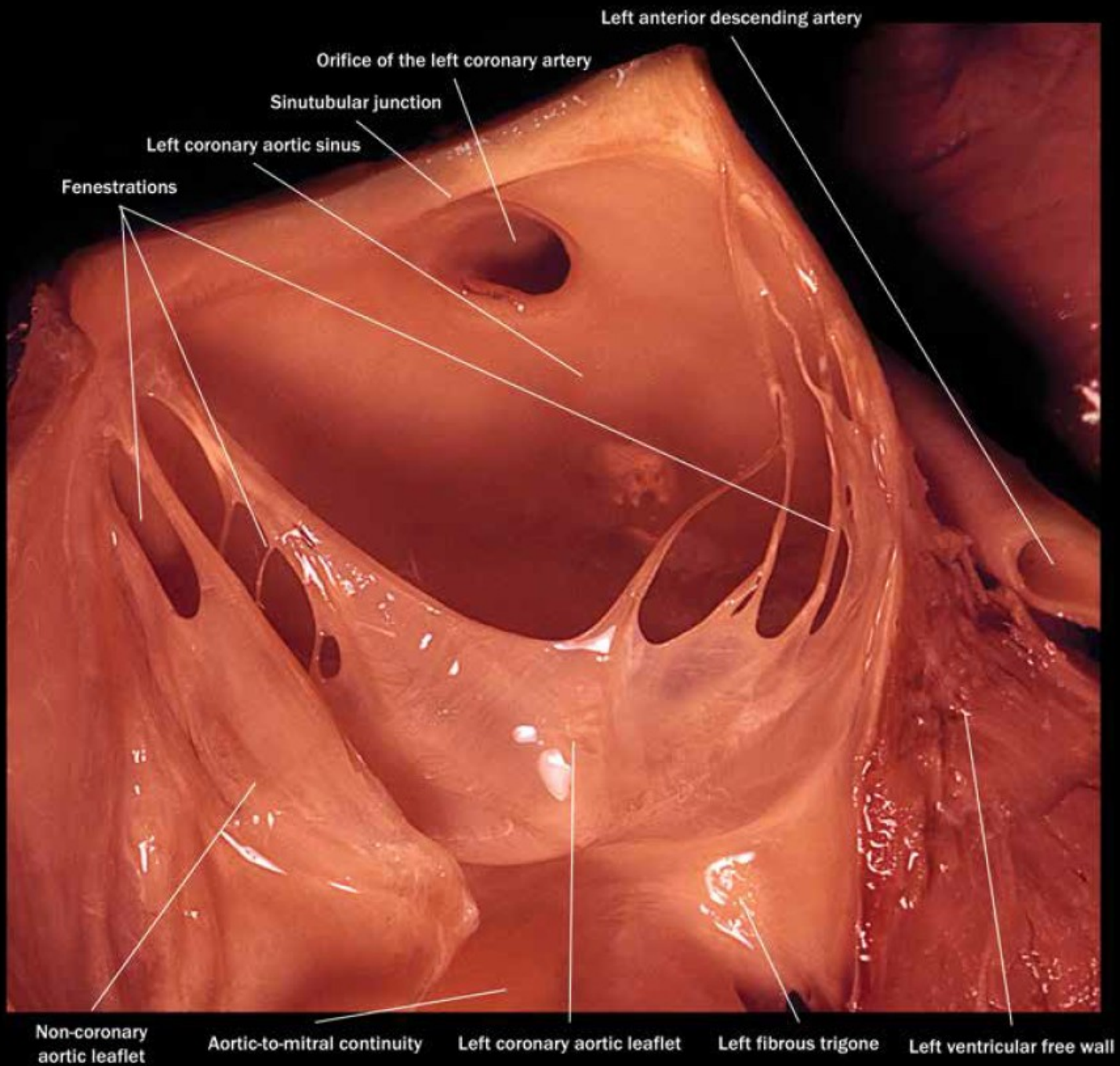
Left anterior  
descending artery

Left circumflex  
artery

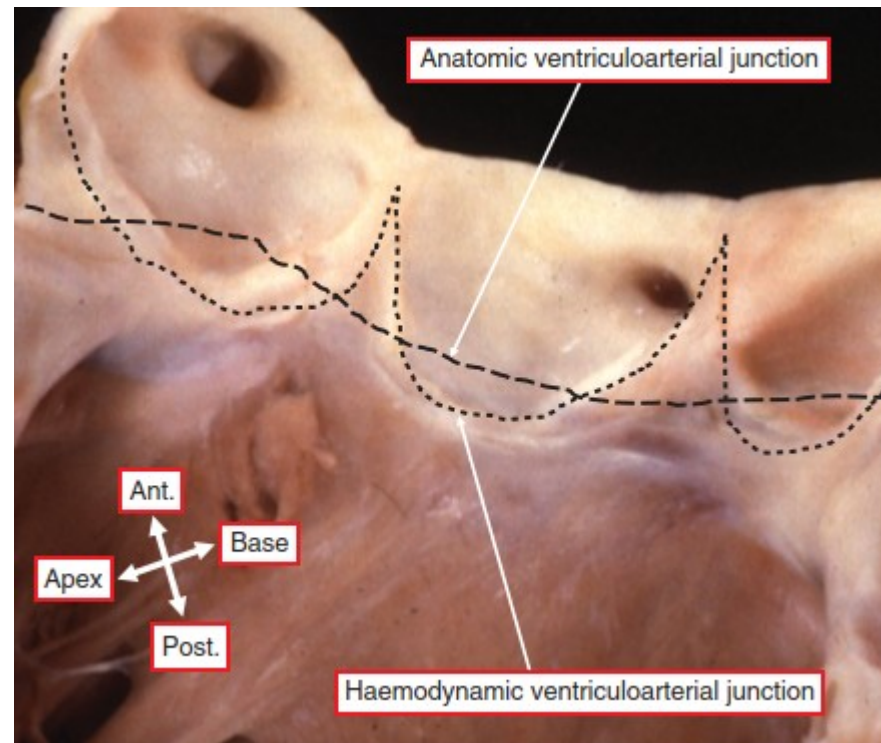
Left main trunk

Left coronary  
aortic leaflet

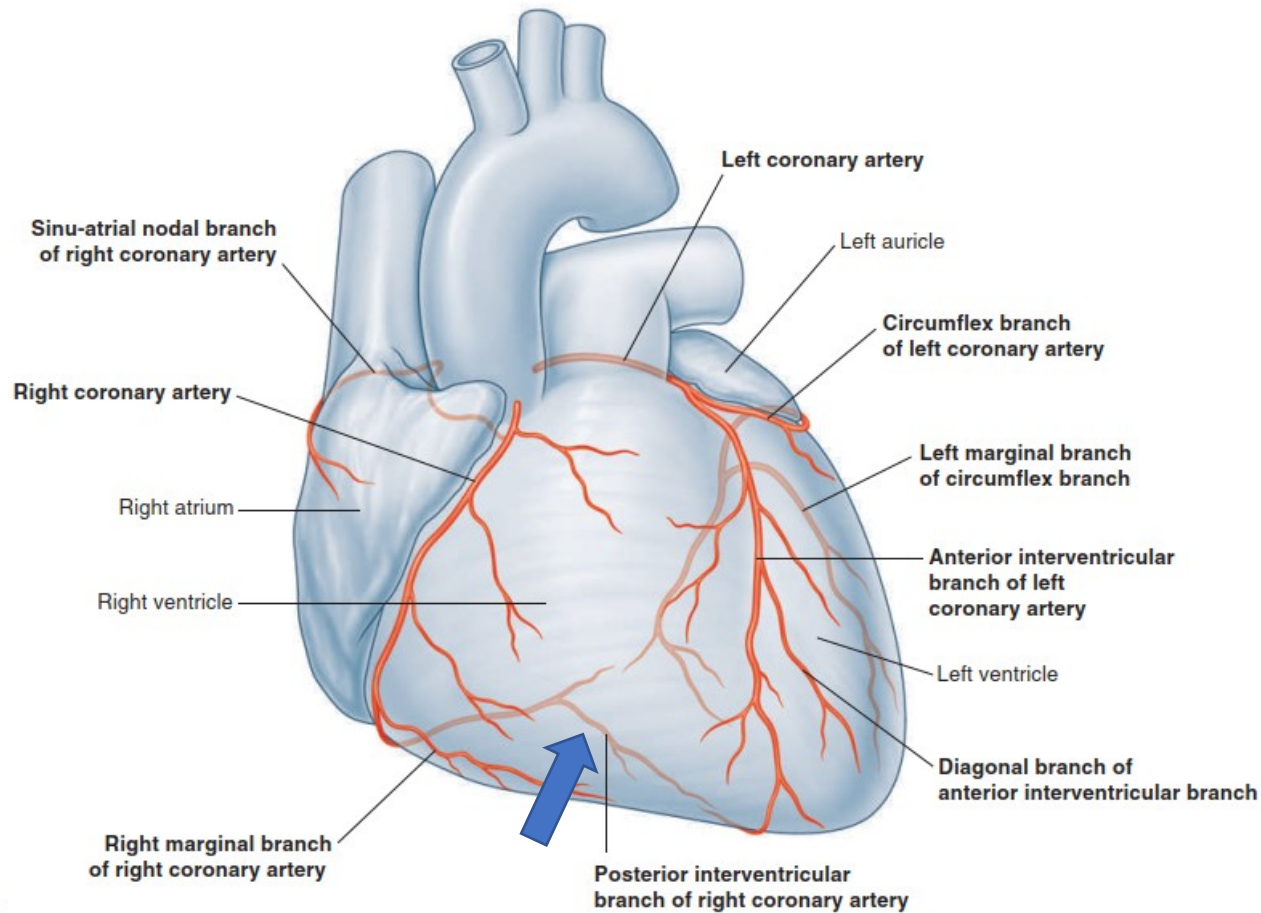
Non-coronary  
aortic leaflet



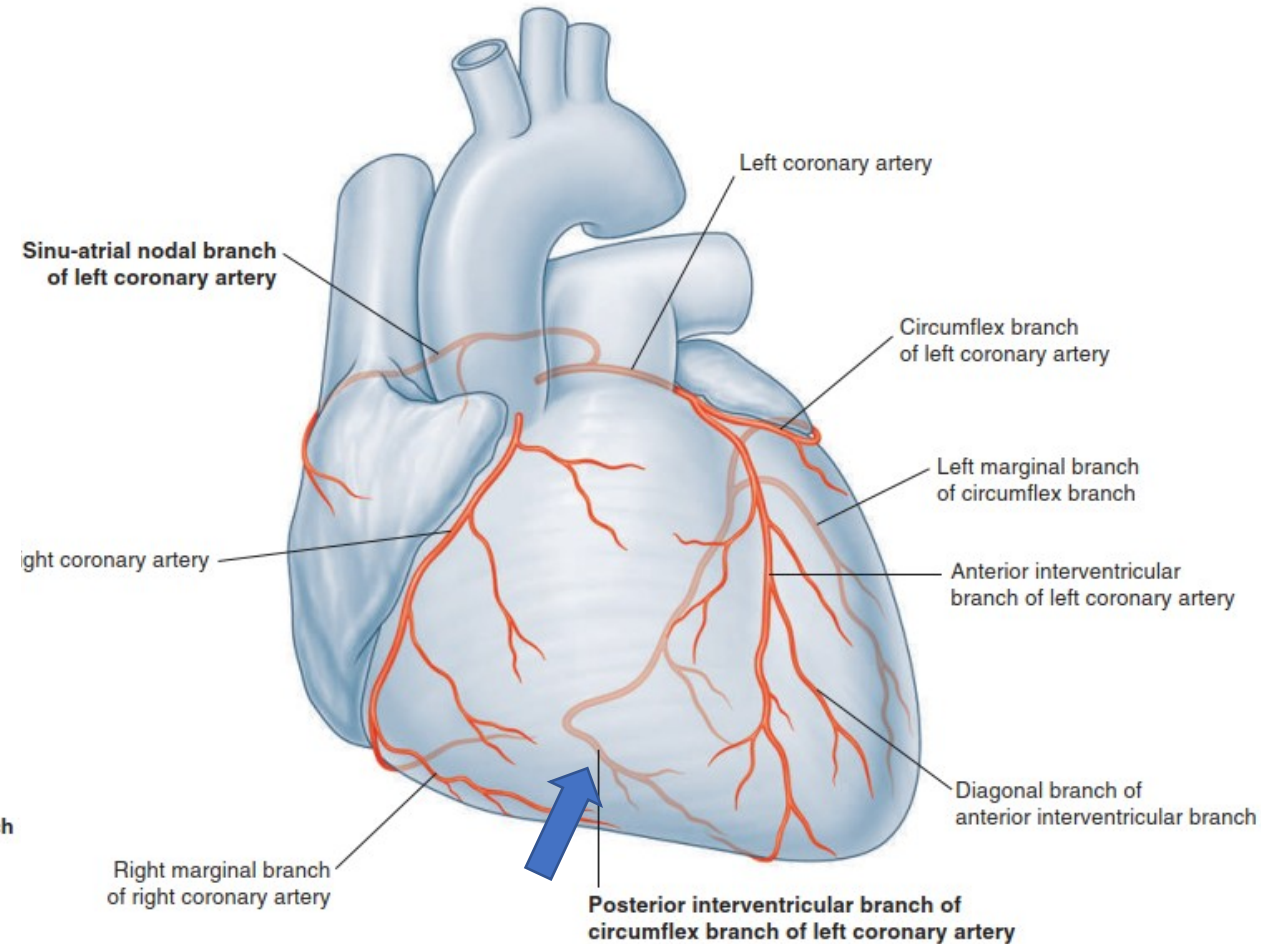




# Coronary Dominance

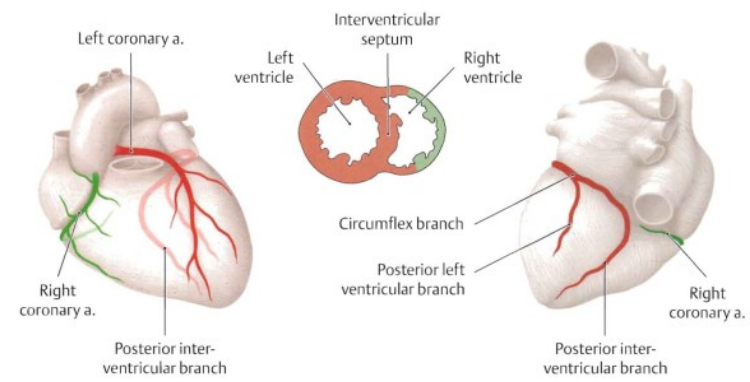


Right Dominant Circulation (80%)

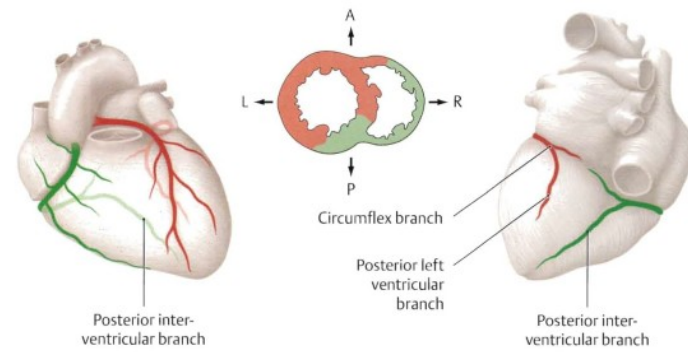


Left Dominant Circulation (10%)

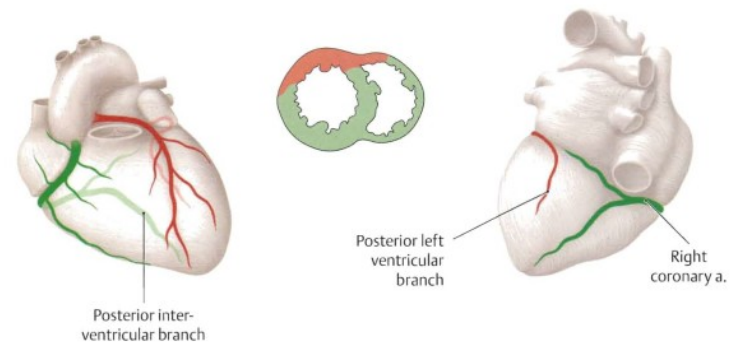
10%



**A** Left coronary dominance (~15%).



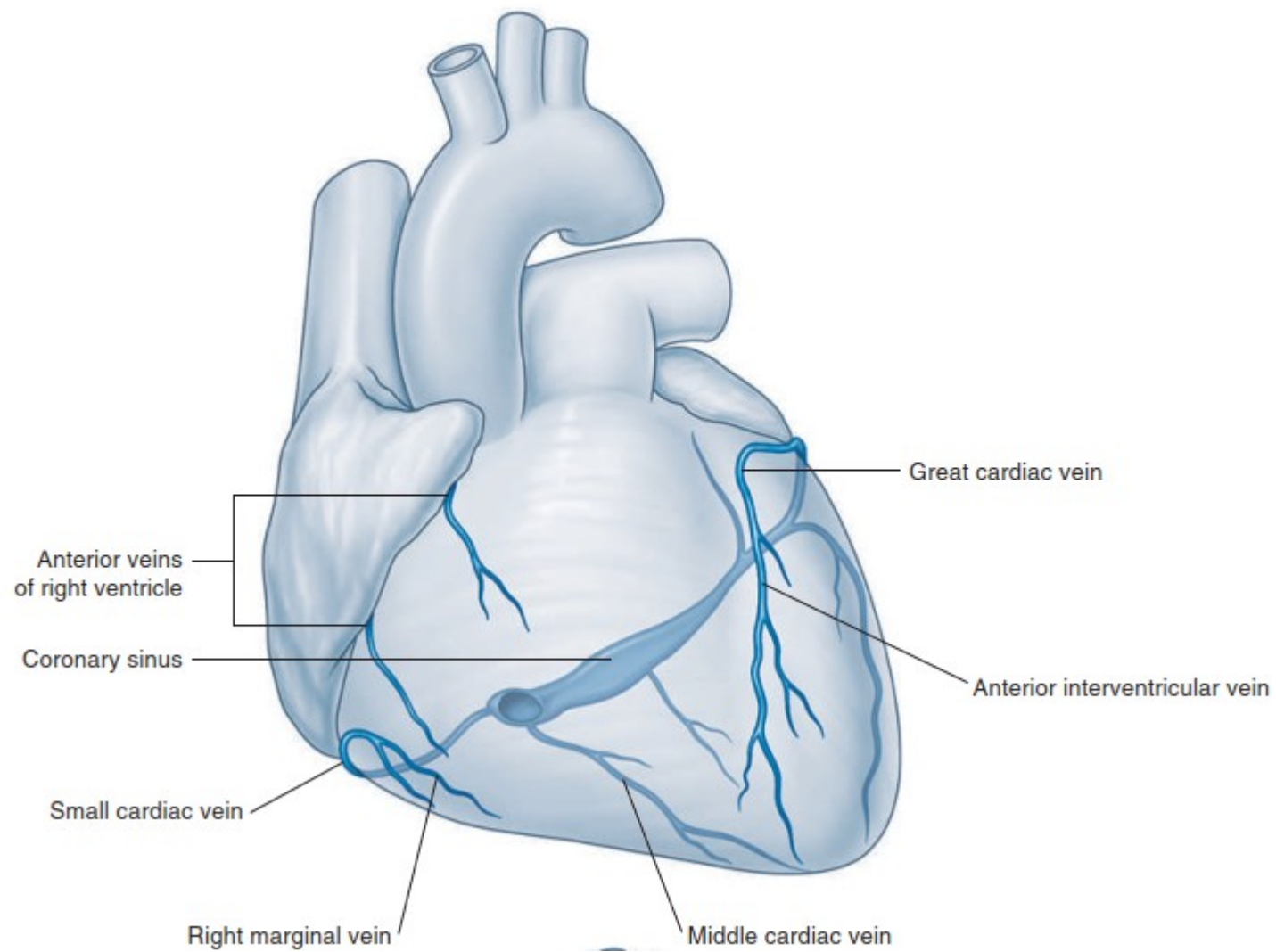
**B** Balanced distribution (~70%).

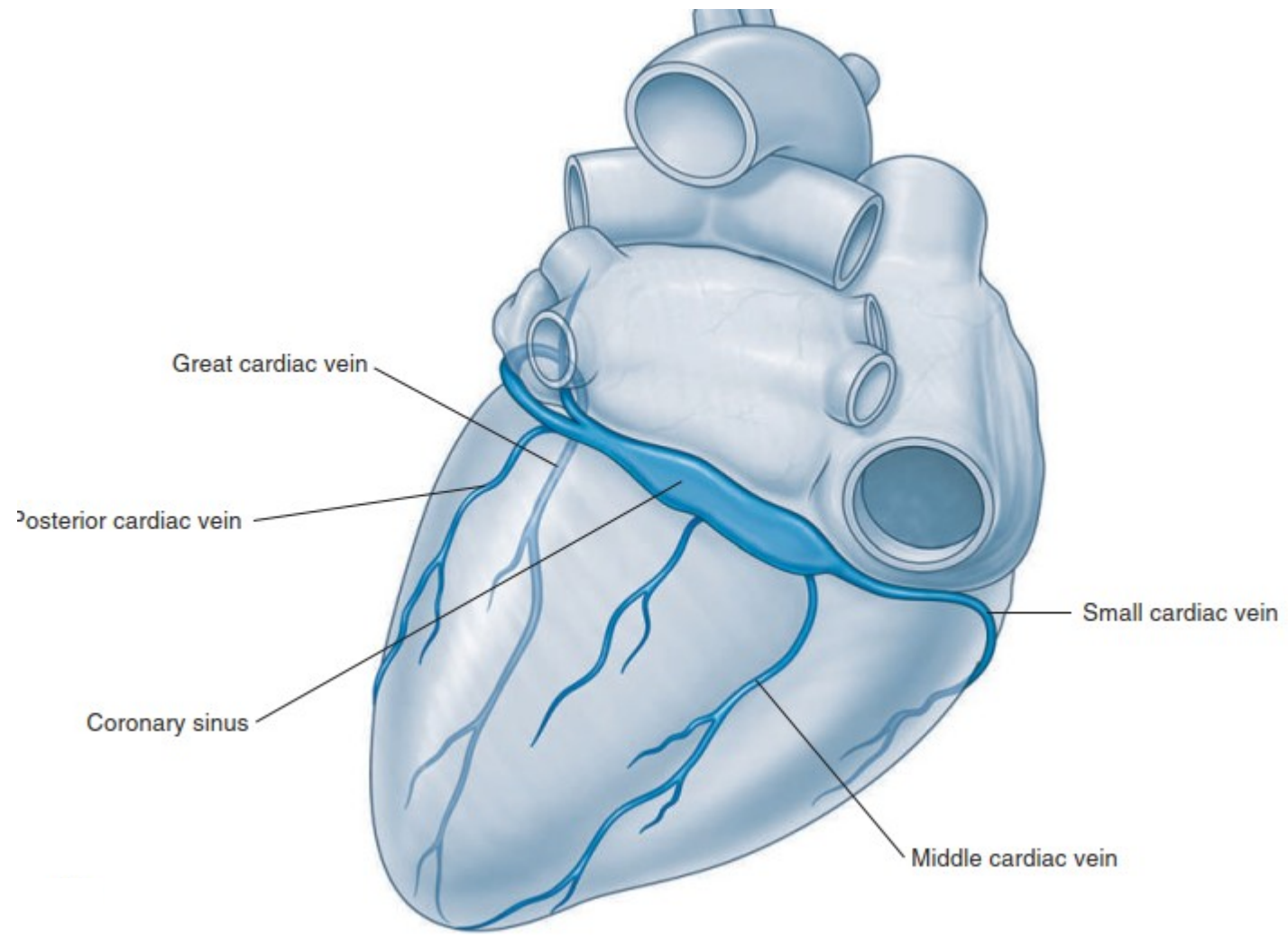


**C** Right coronary dominance (~15%).

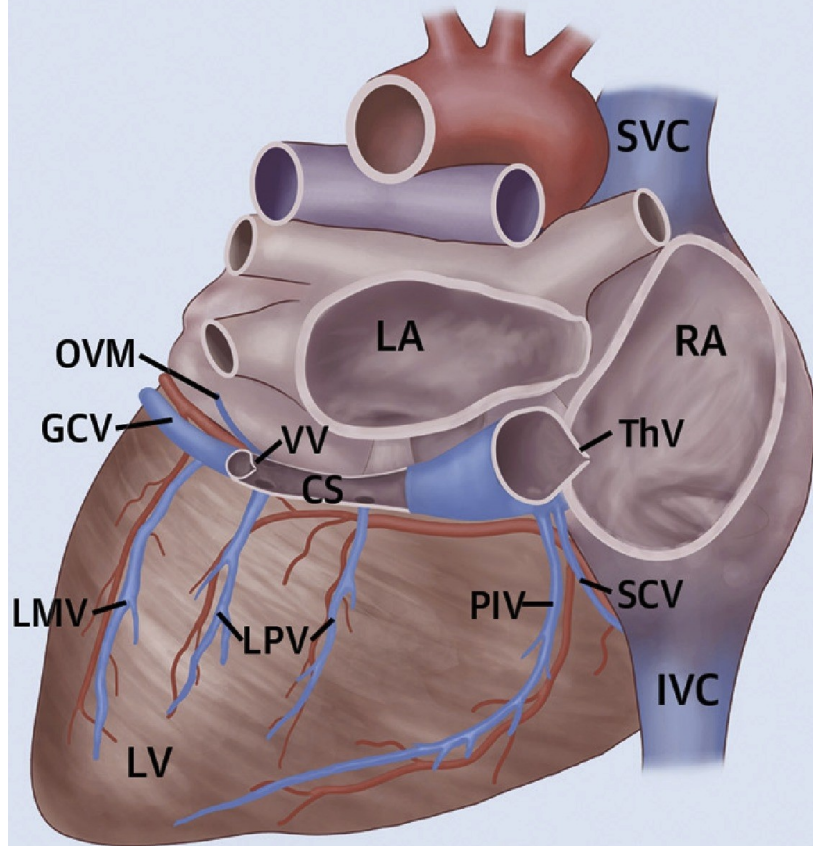
# Venous Drainage of heart



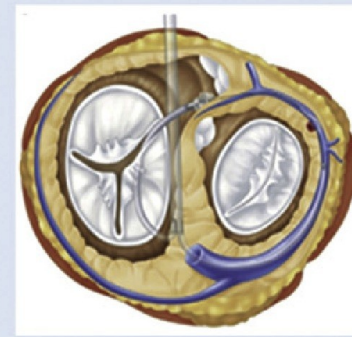




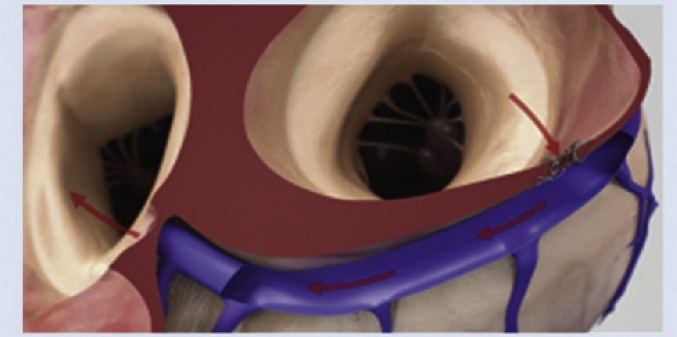
# Applied aspect of Coronary Venous System



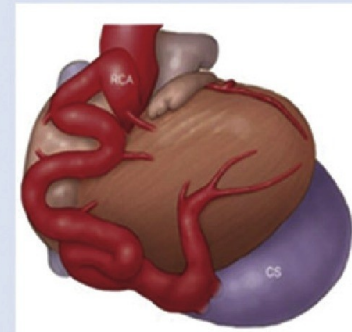
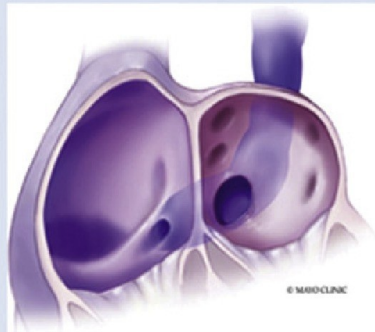
## Mitral Regurgitation



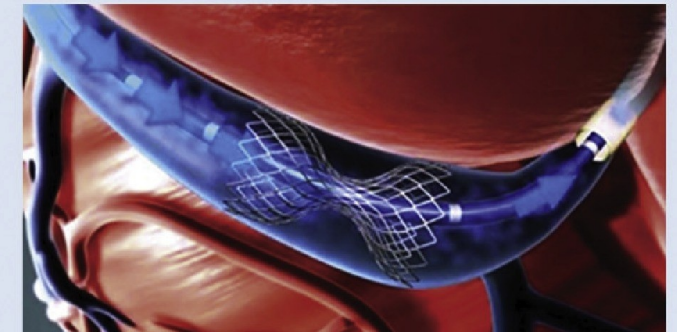
## Heart Failure



## Congenital Defects



## Coronary Ischemia

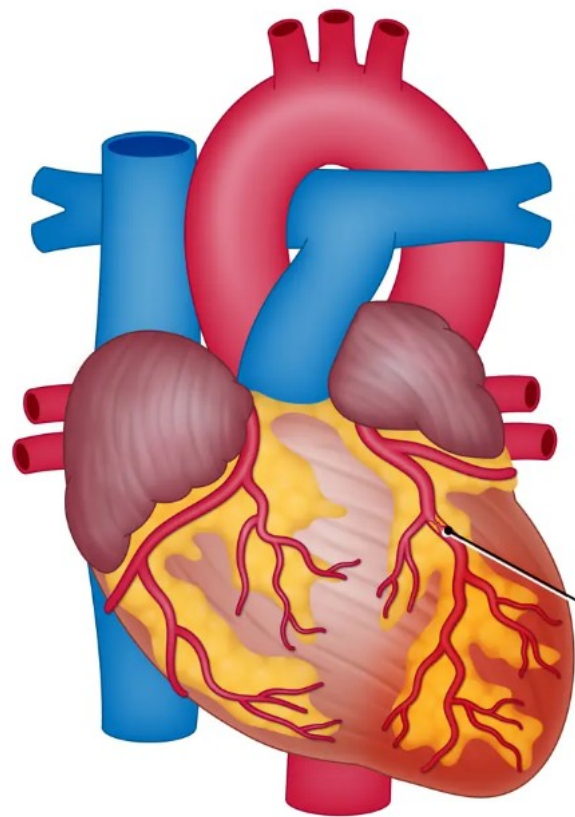


# Applied aspect of Coronary Venous System

- CRT
  - LV lead is placed in the Coronary sinus
- Cardiac Surgery
  - Cardioplegic solution is administered retrogradely via the coronary sinus
- Mapping and Ablation
  - CS lead is placed in Coronary Sinus
  - Left sided Accessory Pathway ablation

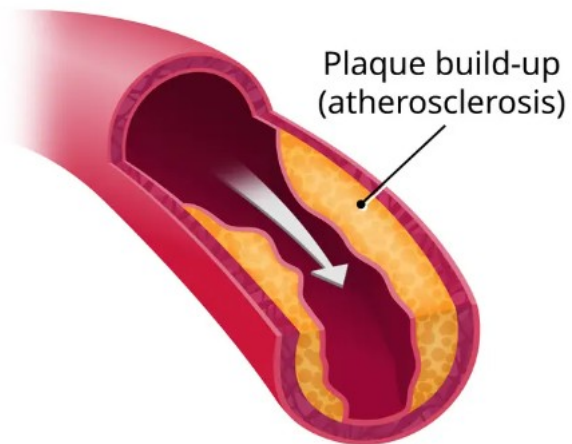


# Myocardial Infarction



Narrowing or  
blocked coronary  
artery

**Narrowing of coronary artery**

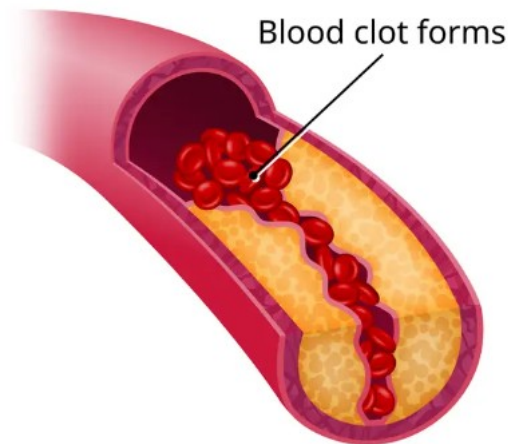


Plaque build-up  
(atherosclerosis)

Reduced blood flow

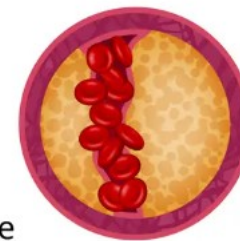


**Blocked coronary artery**



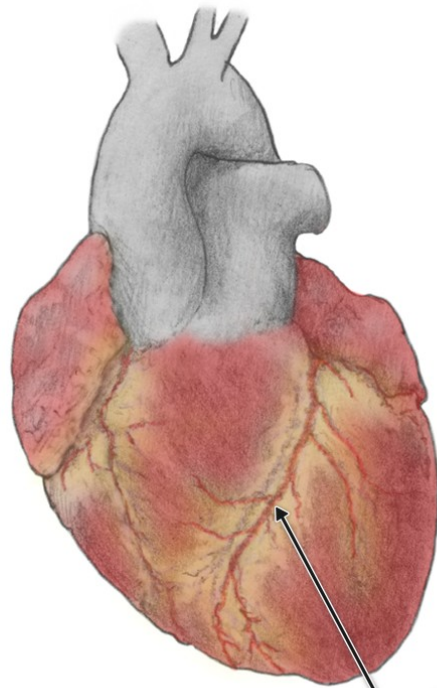
Blood clot forms

Lack of blood flow

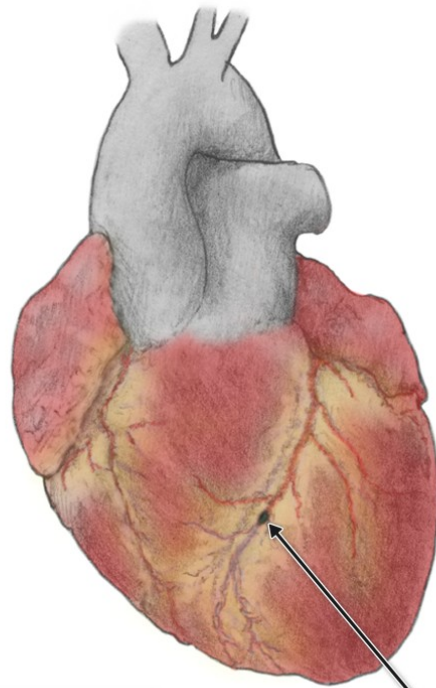


Progression of  
coronary artery disease  
leading to heart attack





**LEFT ANTERIOR  
DESCENDING  
CORONARY ARTERY**



**ARTERIAL  
BLOCKAGE**



**INFARCTED  
TISSUE**

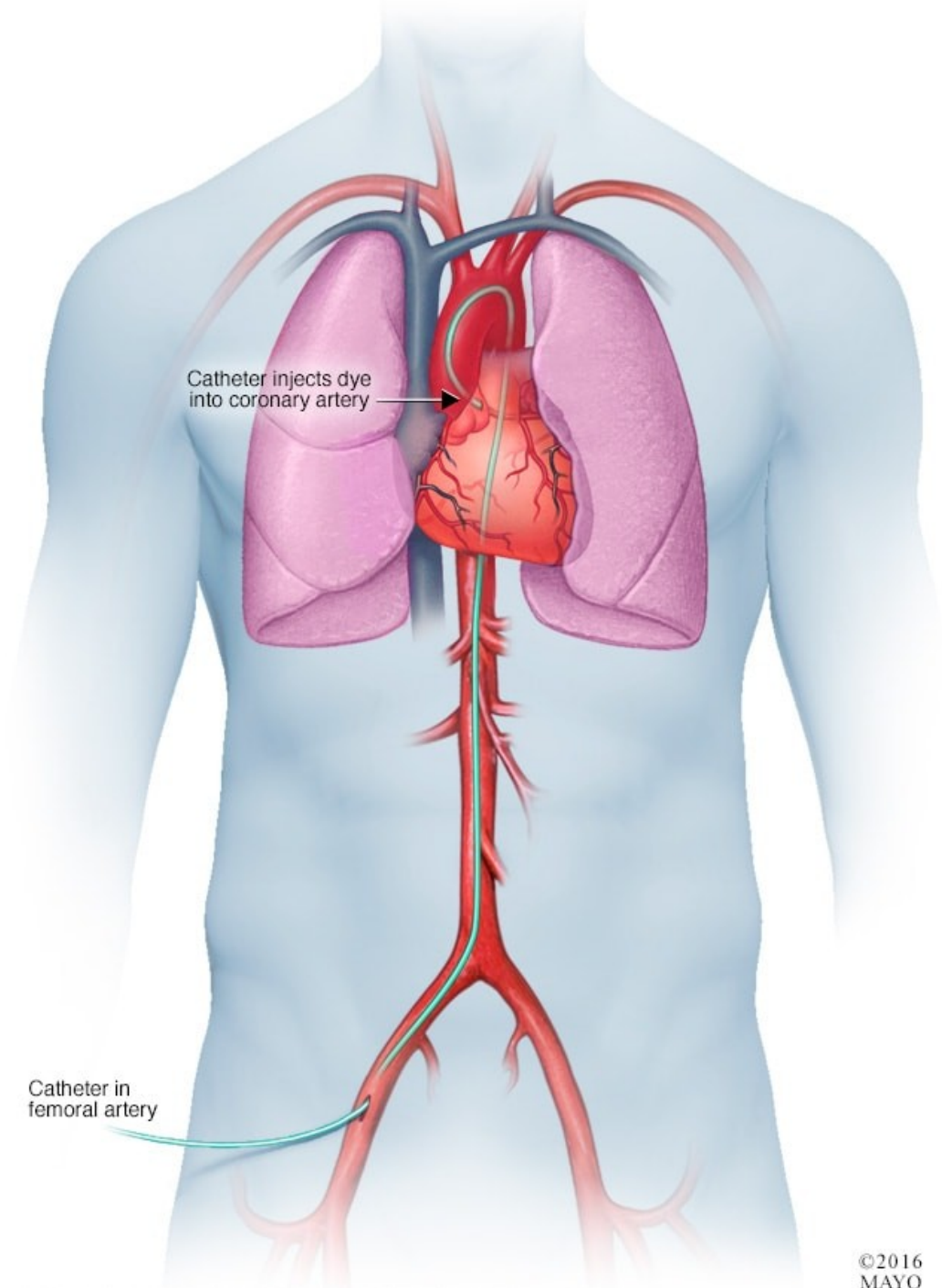
# Coronary Angiography (CAG)



# Cath Lab





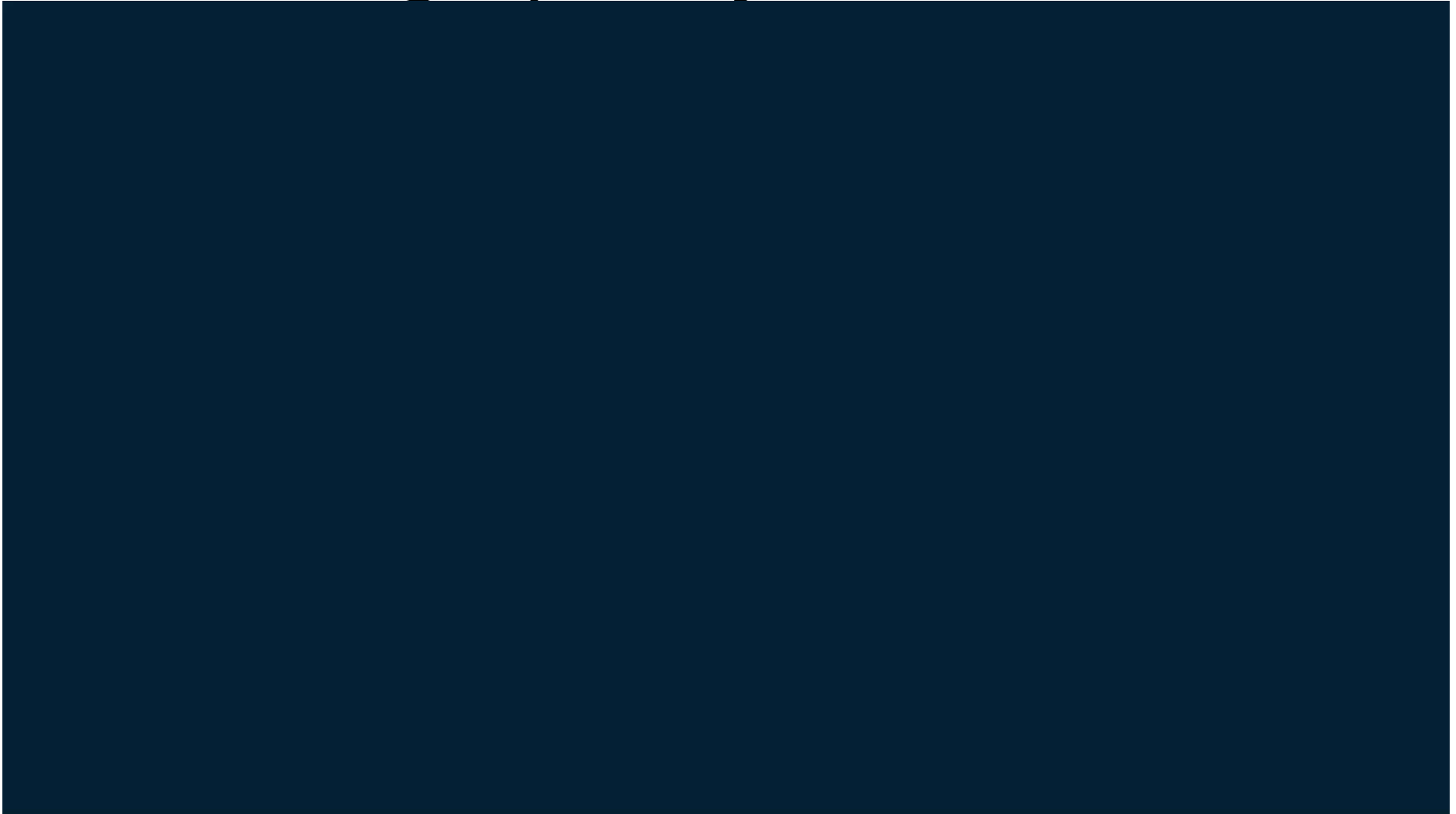


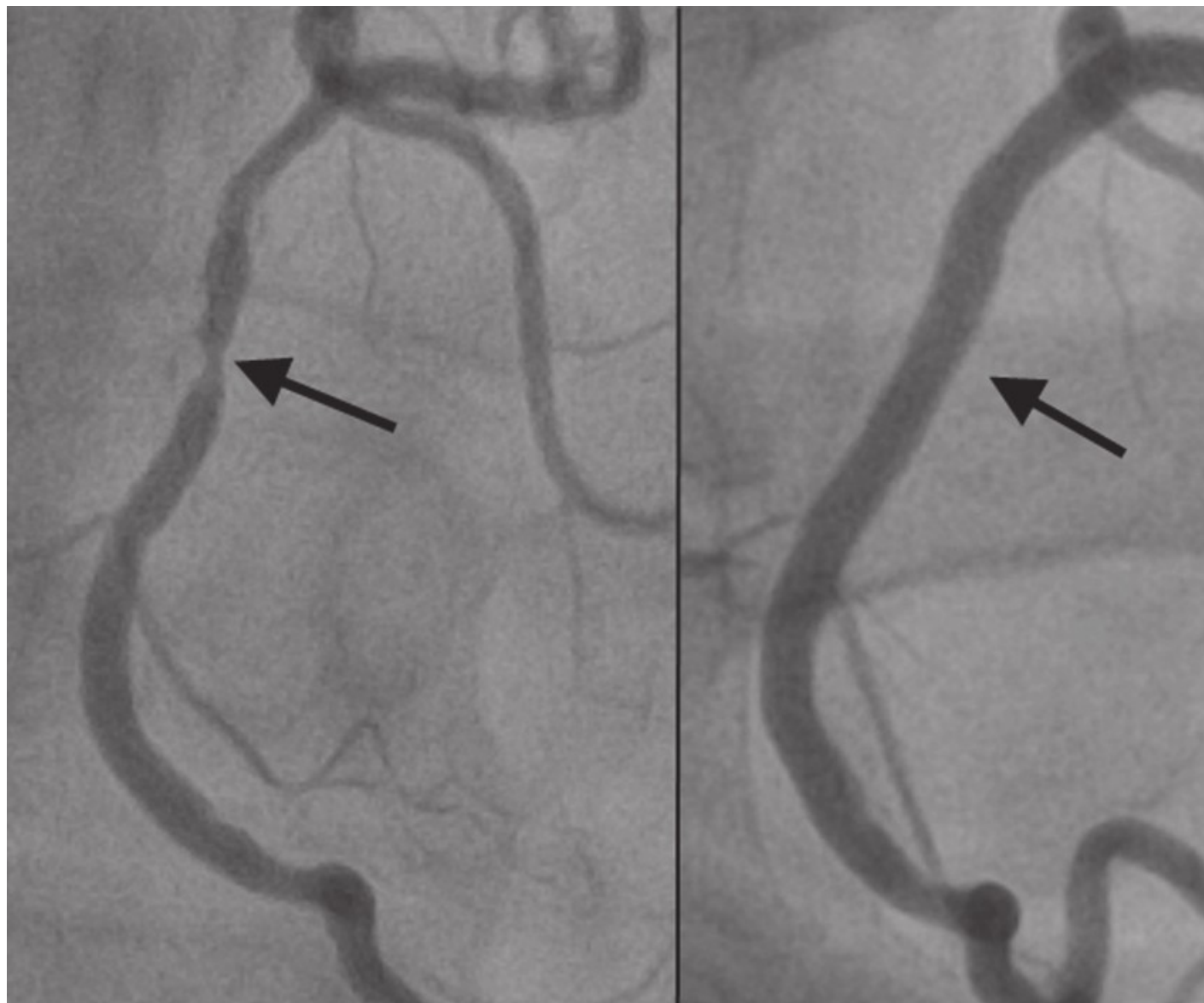
# Coronary Angiogram

Coronary Artery Branches  
*in*  
Coronary Angiogram

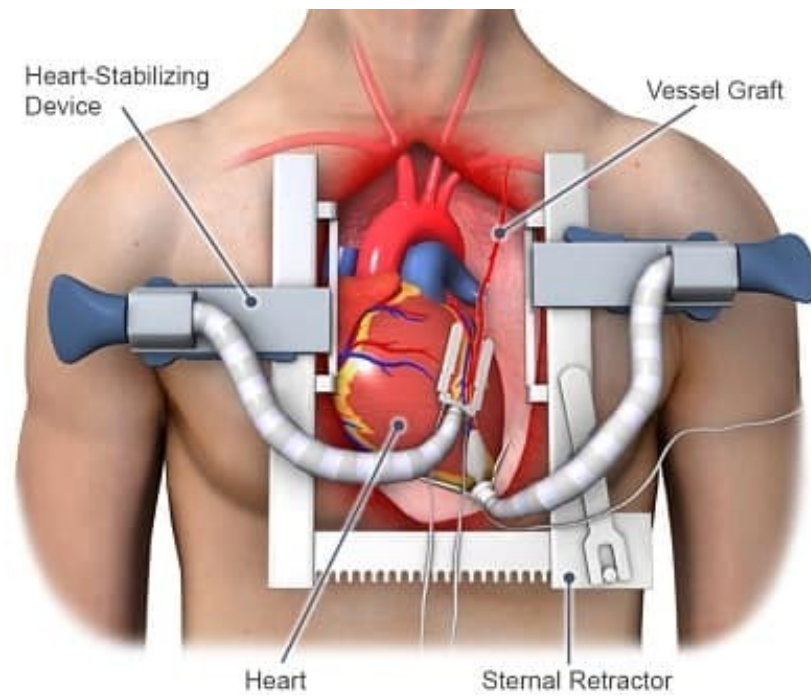


# Percutaneous Transluminal Coronary Angioplasty – PTCA



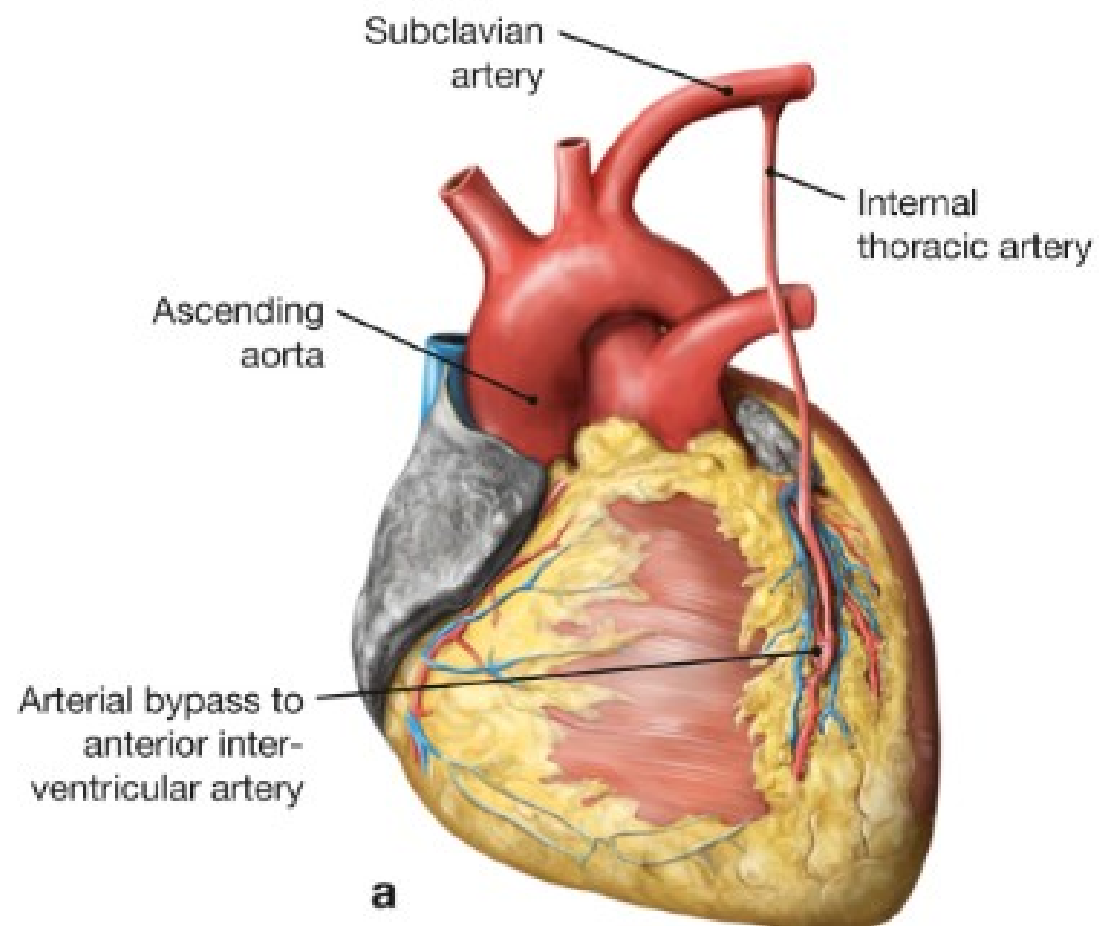


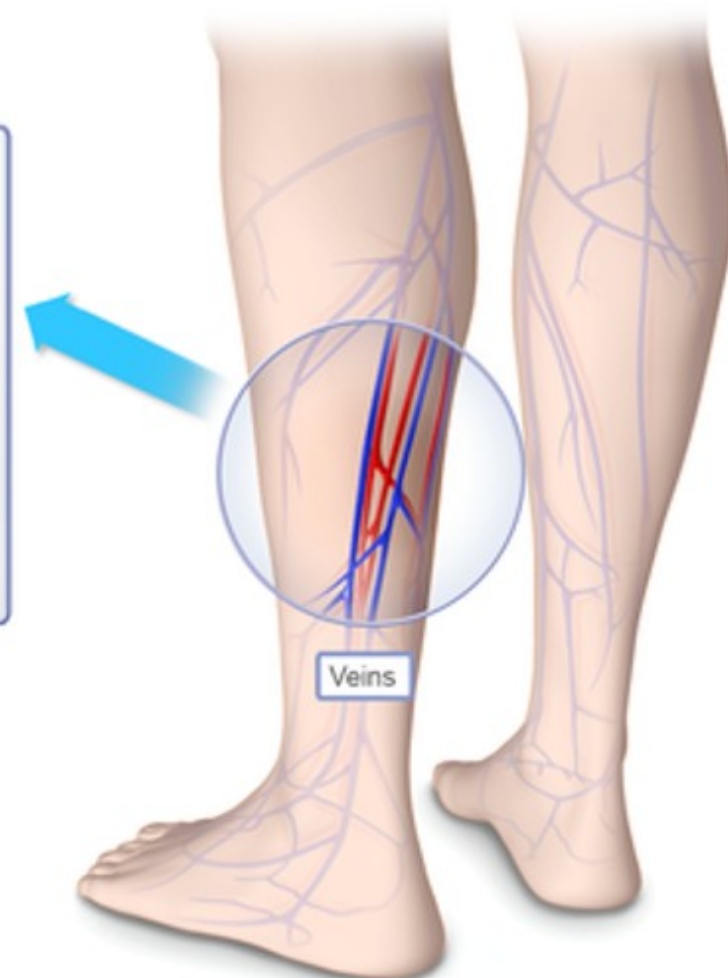
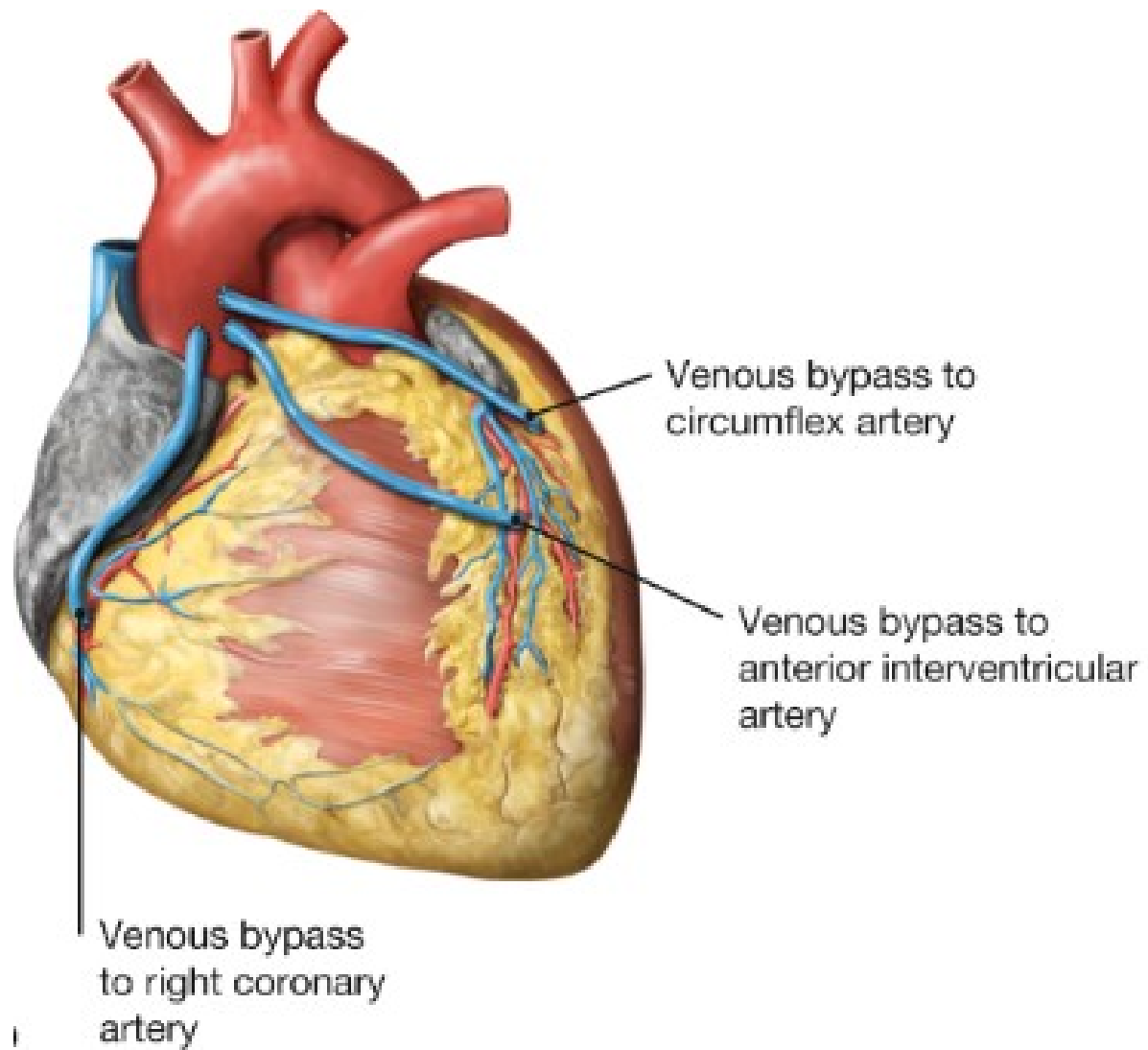
CABG











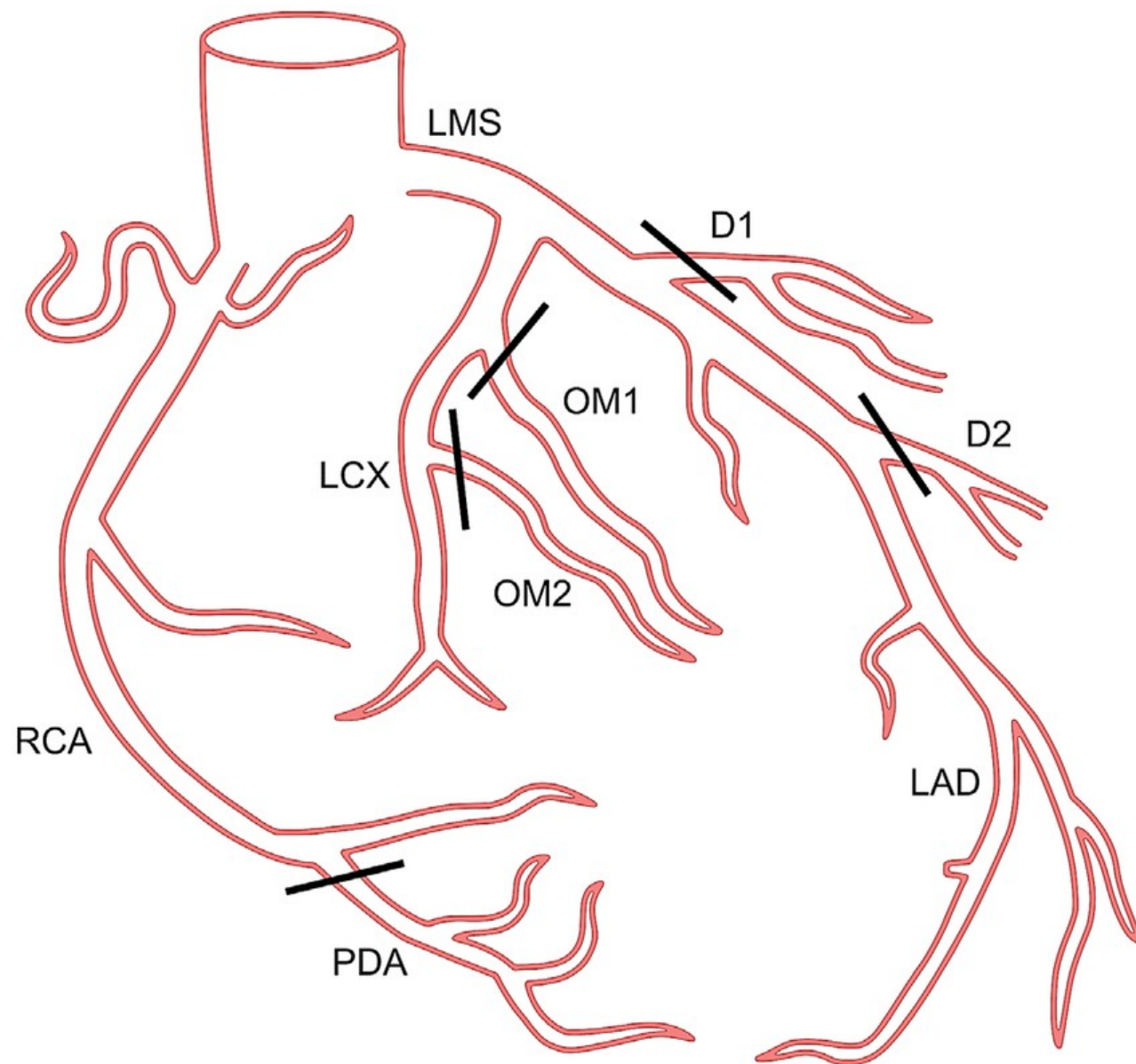


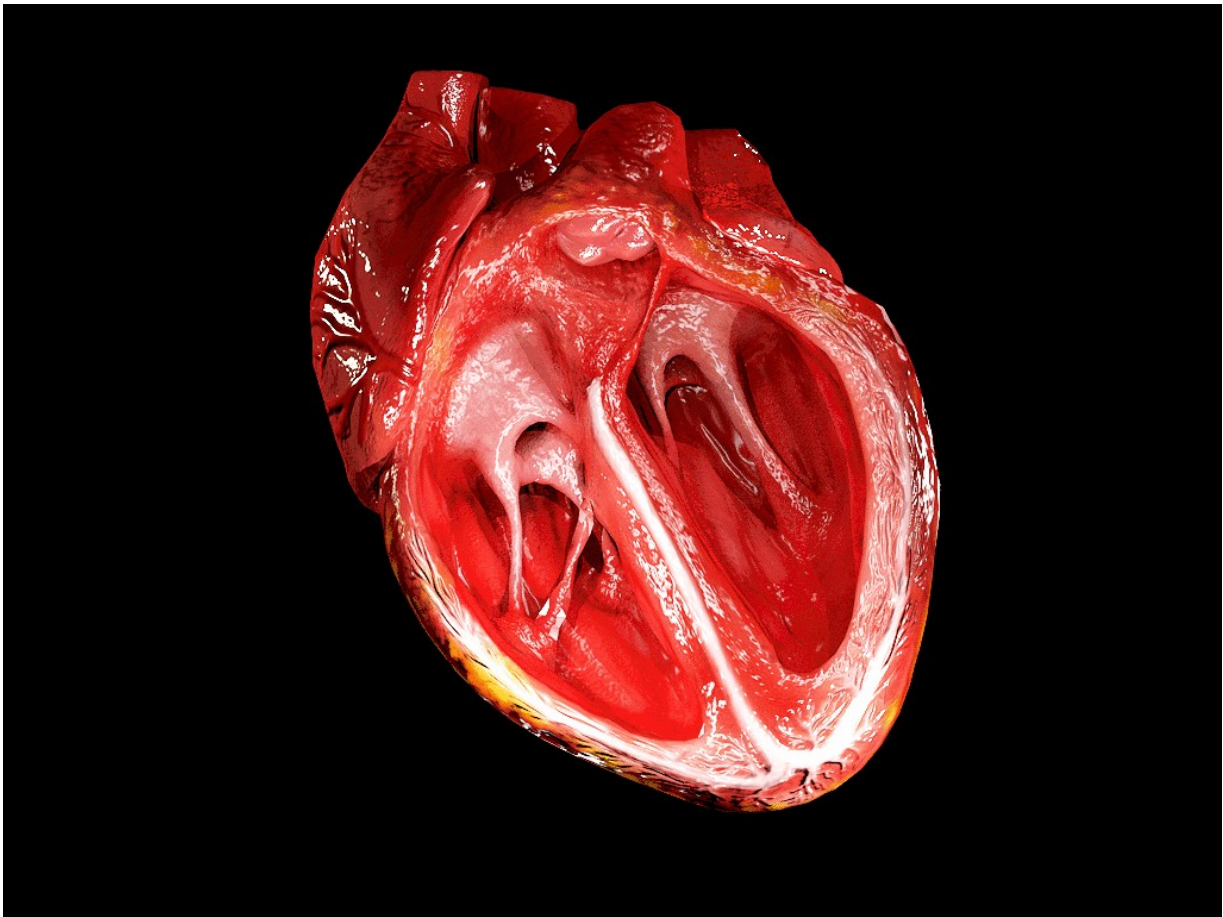
# Off-pump coronary surgery

A 64-year-old patient with a diagnosis of CHD was admitted. Complaints: for pain of a compressive nature behind the sternum, shortness of breath, occurring against the background of physical exertion, stopping independently at rest. After a full examination, we decided to perform CABG using T- and I-graft technique with «no-touch» aorta.



THANK YOU





**EXTRAS**



